United States Department of the Interior
Bureau of Land Management

Environmental Assessment
DOI-BLM-CO-S010-2015-0015 EA

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Tres Rios Field Office and Canyons of the Ancients Fire Management Planning

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CHAPTER 1: INTRODUCTION

1.1 Introduction

The Tres Rios Field Office (TRFO) and Canyons of the Ancients (CANM) Fire Management Planning Environmental Assessment (EA) is an analysis of actions proposed for landscape scale fire management activities within an area of 675,804 BLM administered acres (Figure 1.1) in extreme Southwest Colorado. The proposed action would allow for naturally ignited unplanned ignitions to be managed to meet resource objectives on 304,450 acres of TRFO, while on the remaining 371,353 acres (part of TRFO and all of CANM), unplanned ignitions would be managed to meet protection objectives under a suppression strategy. The analysis contained within this EA will be incorporated into a Fire Management Plan, which details strategies and mitigations that fire managers will use during the decision making process of managing unplanned ignitions on BLM administered land within the project area.

Federal fire policy defines a wildland fire as being either planned and unplanned ignitions. Planned ignitions are prescribed fires, which are not analyzed by the proposed action. Unplanned ignitions are defined as wildland fires which are started by natural causes or human activities outside of the scope of planned ignitions. The proposed action refers only to naturally ignited (lightning) unplanned ignitions. For brevity and reader clarity, this is shortened to "Fires," or "Wildfires." Throughout this document, these terms refer to naturally ignited unplanned ignitions, unless it is explicitly stated otherwise.

1.2 Purpose and need for the proposed action

The BLM's purpose for the proposed action is to manage unplanned ignitions to achieve a balance of suppression, the protection of life, property, and natural resources, and the management of unplanned ignitions for resource benefit, to regulate fuels, and maintain healthy ecosystems and vegetation conditions in areas where fire had a historic role in the ecosystem. As a result of this analysis, the Tres Rios Field Office and Canyons of the Ancients Fire Management Plan (FMP) will be updated in order to be compliant with this analysis. Any fuels management treatments would still require site specific analysis compliant with the National Environmental Policy Act, and would incorporate this document by reference.

The need for this EA is driven by fire policy as well as a recent update of the Tres Rios Field Office Resource Management Plan (RMP). While the CANM RMP has not changed with regards to fire and fuels management since its approval in June, 2010, an EA was never completed analyzing the allowable uses of fire and fuels management. As such, both TRFO and CANM will be analyzed by this EA.

Federal Wildland Fire Management Policy (FWFMP) was created in 1995, by the Secretaries of Interior and Agriculture, and updated in 2001 to require all federal lands with burnable vegetation to have an FMP. Since 2001, additional changes and revisions have occurred, with the most recent being in February 2009 (Guidance for Implementation of Federal Wildland Fire Management Policy). This guidance directs agencies to achieve a balance between suppression; protection of life, property and natural resources; and the use of wildland fire for resource benefit, to regulate fuels, and maintain healthy ecosystems in accordance with the approved Resource Management Plan (RMP) for an area.

This EA's single overriding objective is public and firefighter safety during all phases of wildland fire response. Resource management direction contained within the RMP's will be met by providing fire management strategies, tactics, and alternatives.

1.3 Conformance with BLM Land Use Plan(s)

Land Use Plan Name: Tres Rios Field Office Resource Management Plan, 2015
Land Use Plan Name: Canyons of the Ancients National Monument Resource Management Plan, 2010

The proposed action is in conformance with the applicable LUP(s) because it is specifically provided for in the following LUP decision(s).

Tres Rios Field Office RMP
Desired Conditions

- *2.1.1 Public lands continue to function as "working lands." Collaborative forest health and rangeland management practices reduce wildfire hazards, contribute to the viability of private ranch lands, and sustain ecosystem services (including watershed health and wildlife habitat). Mining and mineral extraction would continue to occur, subject to market demand, and associated plans, permits, and licenses would be processed in a timely and efficient manner. The local economy benefits from, and contributes to, sustainable resource management, as well as to the preservation of open space. (p. II-8)*
- *2.1.15 Timber and fire management is used in order to restore stands to an uneven-age condition where natural fire regimes and natural processes can occur, and where a multi-aged and multi-cohort forest structure resilient to disturbance is established. (p. II-10)*
- *2.3.1 The composition, structure, and function of terrestrial ecosystems are influenced by natural ecological processes, including disturbance events such as fire, infestations by insects or disease, winds, and flooding. (p. II-15)*
- *2.3.9 Forested terrestrial ecosystems display a Fire Regime Condition Class of 1. (p. II-15)*
- 2.3.11 through 2.3.33 describes desired conditions of vegetative communities within Tres Rios Field Office.
- *2.5.5 Riparian area and wetland ecosystems are resilient to change from disturbances (including from floods, fire, and drought) and offer resistance and resilience to changes in climate. (p. II-40)*
- *2.12.1 Firefighter and public safety concerns are met for all fire management and fuel treatment projects. (p. II-61)*

- *2.12.2 Wildfire behavior in the WUI (in and around developed areas and communities) does not result in damage to property and protects public safety. (p. II-61)*
- *2.12.3 Wildland fire management maintains a balance between fire suppression and use of wildland fire (including both prescribed fire and natural ignitions) to regulate fuels and maintain forest ecosystems in desired conditions. (p. II-61)*
- *2.12.4 Use of wildland fire and fuels reduction treatments creates vegetation conditions that reduce the threat to real property and infrastructure from wildfire. (p. II-61)*
- *2.12.5 The WUI will have defensible space and dispersed patterns of fuel conditions that favorably modify wildfire behavior and reduce the rate of wildfire spread in and around communities at risk. (p. II-61)*
- *2.12.6 Major vegetation types reflect little or no departure from historic range of variation of fire frequency and intensity (e.g., reflect Fire Regime Condition Class 1). (p. II-61)*
- *2.12.7 Planned and unplanned fire ignitions are used to increase resiliency and diversity across all forest and rangeland vegetation types. (p. II-61)*
- *2.12.8 The occurrence of low elevation fires burning upward into spruce-fir forest will increase over time to promote the heterogeneity of spruce-fir forests. (p. II-61)*

Objectives

- *2.3.45 Within 15 years, increase the percent of ponderosa pine forests in the young development stage from 0% to 3% by using mechanical treatments (e.g., timber harvest) or fire (prescribed or natural ignitions). (p. II-21)*
- *2.3.46 Within 15 years, increase the percent of warm-dry mixed conifer forests in the young development stage from 0% to 3% by using mechanical treatments (e.g., timber harvest) or fire (prescribed or natural ignitions). (p. II-21)*
- *2.3.47 Within 15 years, improve the composition, structure, and function of 5,000 acres of ponderosa pine forests by using low-intensity fire). (p. II-21)*
- *2.12.10 Annually, for the next 10 years, complete an average of 1,000 acres of fuels reduction and resource enhancement using fire managed for resource benefit. (p. II-61)*
- *2.12.11 Include evaluations for immediate suppression, management for resource benefit, or a combination of both actions for wildland fire response. (p. II-61)*

Standards

- *2.12.12 Natural fire ignitions will be used, when feasible, to reintroduce fire into fire-adapted and dependent ecosystems. Fire for ecological benefit will be used as a resource management tool where and when allowed. (p. II-62)*
- *2.12.13 Restoration and recovery in areas, when possible, must be provided where critical resource concerns merit rehabilitation for controlling the spread of invasive species, protecting areas of cultural concern, or protecting critical or endangered species habitat. (p. II-62)*

Canyons of the Ancients National Monument RMP
Goals and Objectives

- *Goal A: Preserve and protect cultural and natural resources and public and private property, allowing managed fire (including prescribed burns) to play a limited role in accomplishing this goal in fire-dependent ecosystems.(p. 56)*

- *Objective: Ensure an appropriate management response for each reported wildfire within the Monument by developing a Fire Management Plan (FMP) that integrates with … the Montezuma County and Dolores County Community Fire Plans…Ensure that fire management tactics and strategies maximize firefighter and public safety; and minimize suppression costs, resource loss, and damage…(p. 56)*

Management Actions: Allowable Uses and Actions

- *Designate the entire Monument as FMZ B (area where natural fire is generally not desired under current conditions and suppression is emphasized)… (p. 56)*
- *Conduct research in order to determine the historic ranges of variability (HRVs) in historic fire regimes, woodland structure, and adjacent vegetation types within the Monument, as funding becomes available. Use these data in order to develop ecologically sound desired future conditions for all vegetation management decisions through adaptive management planning processes. (p. 56)*

1.4 Relationships to Statutes, Regulations, and Other Plans

1. Protection Act of September 20, 1922 (42 Stat. 857; 16 United States Code [USC] 594).
2. Taylor Grazing Act of June 28, 1934 (48 Stat. 1269; 43 USC 315).
3. Reciprocal Fire Protection Act of May 27, 1955 (69 Stat. 66; 42 USC 1856, 1856a).
4. Economy Act of June 30, 1932 (47 Stat. 417; 31 USC 686).
5. Federal Land Policy and Management Act of 1976 (Public Law 94-579; 43 USC 1701).
6. Disaster Relief Act, Section 417 (Public Law 93-288).
7. Annual Appropriations Acts for the Department of the Interior (DOI).
8. United States Department of the Interior Manual (296 DM 1).
9. Healthy Forests Restoration Act of 2003 (H.R. 1904), Public Law 108-148, December 3, 2003.
10. Sikes act of 1960 (16 USC sec. 670a)
11. Clean Air Act of 1977 (USC 7401 et seq.)
12. Colorado Department of Public Health and Environment Air Quality Control Commission Regulation No. 9
13. Archaeological Resource Protection Act of 1974
14. American Indian Religious Freedom Act of 1978
15. National Historical Preservation Act of 1966 as Amended
16. National Environmental Policy Act of 1969, as amended (42 USC 4321 et seq.)
17. 1973 Endangered Species Act, as amended
18. Migratory Bird Treaty Act of 1918 (16 USC 703711)
19. Bald and Golden Eagle Protection Act (1962)
20. Standards for Public Land Health: In January 1997, Colorado Bureau of Land Management (BLM)

1.5 Scoping and Public Involvement

An interested public scoping letter describing the project proposal was mailed to over 200 potentially interested publics on July 21, 2015. The letter was sent to groups or individuals who have expressed an interest in participating in fire management projects as well as State and Federal wildlife agencies, and tribes. Three responses were received during as a result of scoping from Tribes, of which the Hopi requested to be sent a draft Environmental Assessment for

comment. The proposed action was also scoped at a tribal consultation meeting at the Anasazi Heritage Center on September 15, 2015. Tribes expressed the importance of cultural resources on the landscape, which is analyzed in Chapters 3.6 and 4.2.6.

Parties who had expressed an interest in reviewing the draft Environmental Assessment were provided the opportunity on February 22, 2016 for 21 days, ending on March 14, 2016. Two comments were received during this timeframe, one from Colorado Parks and Wildlife, and the other from the Hopi Tribe. These comments are addressed in Chapter 5.3.

1.6 Identification of Issues

The proposed action was internally scoped with the Tres Rios Field Office and Canyons of the Ancients National Monument Interdisciplinary Team on March 17, 2015. The following issues were identified and analysis of these issues can be found in Chapters 3 and 4.

Issues carried forward for analysis in this EA are the potential impacts of fires managed under the proposed action or fire effects thereof on: Soils and Water-Dependent Features, Fire Management, Cultural Resources, Wildlife (including threatened, endangered, and sensitive species), Invasive Species, Wild Horses & Burros, and Vegetation (Including Threatened, Endangered, & BLM Sensitive species).

1.7 Issues Considered but Eliminated from Detailed Analysis

1.7.1 Air Quality & Greenhouse Gas Emissions

Conditions under which the proposed action would be implemented along with design features of the proposed action are such that the impacts of particulates and other pollutants would be expected to meet the Colorado Air Quality Control Commission's stated air quality goals for fire management. The proposed action is in compliance with AQCC Regulation 9, which states, "Wildfires are beyond the scope of this regulation and no permitting requirements apply to a land manager within whose jurisdiction a wildfire occurs." Therefore, no detailed analysis is needed.

1.7.2 Recreation, Visual Resources, & Special Status Lands

The proposed action would not result in any planned displacement of users, area closures, or noticeable alterations of setting. Best Management Practices within special status lands would result in no effect on these lands as a result of the proposed action, and therefore no detailed analysis is needed.

1.7.3 Lands/Access

Damage to improvements or right of ways would be mitigated with design features of the proposed action, and therefore no detailed analysis is needed.

1.7.4 Rangeland Management

Naturally ignited unplanned ignitions managed under the proposed action would be within the historic range of variability, and likely burn across pastures, limiting effects to any one pasture during a single year. Combined with design features identified in Chapter 2.4, no detailed

analysis is needed as there would be no effect on rangeland management as a result of the proposed action.

1.8 Decision to be Made

The BLM will decide how it will manage naturally ignited unplanned ignitions within the planning area. Based on this decision and the analysis contained within this EA, the TRFO and CANM FMP will be updated to be in compliance with national policy.

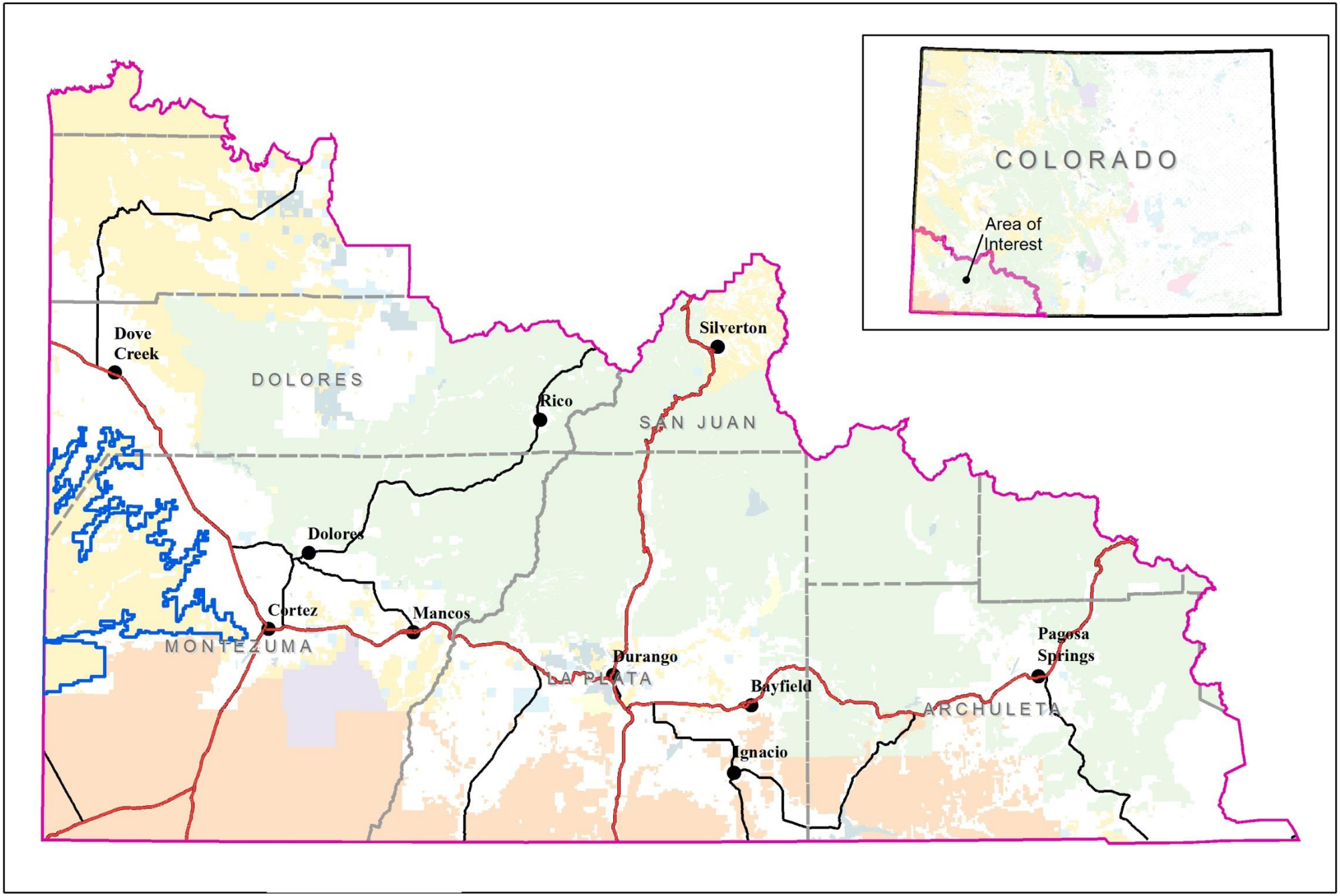

Figure 1.1: Tres Rios Field Office and Canyons of the Ancients National Monument Boundaries and Surface Ownership

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0 5 10 20 30 40 Miles

Legend
CANM Proclamation Boundary
Tres Rios Field Office Boundary
Counties
Highway
U.S.
State
BLM
USFS
BIA
NPS
STATE
BOR
DOD
LOCAL
OTHER
PRIVATE

CHAPTER 2: DESCRIPTION OF ALTERNATIVES

2.1 Introduction

This chapter describes and compares the Proposed Action and the No Action Alternative. No other alternatives were needed to resolve resource conflicts.

2.2 Proposed Action

The BLM is proposing to manage naturally ignited unplanned ignitions. These fires would have the potential to be managed in an area identified as emphasizing the use of fire to meet RMP goals and objectives (304,450.6 acres, Figure 2.1). Fires would not be managed to meet RMP goals and objectives if they were human caused in any area, or in areas which are identified as not having a fire emphasis (371,353.4 acres, Figure 2.1). These would be managed with the intent of minimizing fire size after providing for firefighter and public safety. The Proposed Action would target achieving an average of 1,000 acres of fuels reduction and resource enhancement using fire managed for resource benefit, per year, for ten years. Over the life of this EA, no more than 10,000 acres of fire managed for resource benefit would be implemented within the fire emphasis area identified in Figure 2.1.

Each wildland fire would be evaluated by fire managers and resource advisors on a case by case basis to determine its feasibility to meet specific area objectives as identified in both the TRFO and CANM RMP's. Considerations which would be included in the evaluation criteria of individual naturally ignited unplanned ignitions are:

- Public and Firefighter Safety
- Fire behavior and effects
- Potential fire size
- Adjacent agency/private land that may be impacted
- Level of public use
- Proximity to improvements and infrastructure on both public and private lands
- Historic fire regime and current fire regime condition class
- Seasonal severity and fire weather forecasts
- Fuel conditions
- Potential for sedimentation to municipal or public water supply
- Unique biological, cultural, historical, or archaeological resources
- Potential for non-native species establishment or spread

In some instances, fire managers may allow one part of a fire to be managed for resource benefits while suppression is occurring on another part. In others, full suppression would be required due to proximity to values at risk, seasonality, fire behavior, or other factors. Response to wildland fire under the Proposed Action would include any combination of the following strategies, based on the above considerations:

- Monitor: Fire situations where fire behavior and low threats to values at risk allow only periodic assessment, reducing exposure to responders.
- Manage: Fire situations that require the physical placement of resources on the fire site to document fire behavior characteristics and first order fire effects.

- Confine/Contain: When a fire has ignited within an area bounded by either natural or man-made barriers, and is expected to have the potential to meet resource objectives, fire may be allowed to spread within the area.
- Point Protection: Usually put in place when fire behavior does not allow for safe engagement, or fire is being allowed to spread over the area, but values are at risk from the fire spread. Resources may attempt to mitigate the risk to values through different tactics. This strategy does not address perimeter control of the fire, but may be used at the same time as any of the other listed strategies.

Suppression of wildland fires, regardless of cause, would occur on 371,353 acres (part of TRFO and all of CANM).

The proposed action would alter Fire Regime Condition Class across the planning area, shifting it closer to the historical range of variability (FRCC, Figure 2.2, Table 2.1).

Table 2.1: Fire Regime Condition Class Descriptions

Fire Regime Condition Class	***Description***
FRCC1	Fire regimes are within the historical range and the risk of losing key ecosystem components is low. Vegetation attributes (species composition and structure) are intact and functioning within their historical range.
FRCC2	Fire regimes have been moderately altered from their historical range. The risk of losing key ecosystem components is moderate. Fire frequencies have departed from historical frequencies by one or more return intervals (either increased or decreased). This may result in moderate changes to one or more of the following: fire size, intensity, severity, and landscape patterns. Vegetation attributes have been moderately altered from their historical range.
FRCC3	Fire regimes have been significantly altered from their historical range. The risk of losing key ecosystem components is high. Fire frequencies have departed from historical frequencies by multiple return intervals. This may result in dramatic changes to one or more of the following: fire size, intensity, severity, and landscape patterns. Vegetation attributes have been significantly altered from their historical range.

2.3 No Action Alternative

The no action alternative represents the default strategy for federally managed lands, which is full suppression. In the absence of managing fires to achieve multiple resource objectives and benefits, fires would be suppressed with a focus on minimizing the area burned.

Under the No Action Alternative, fuels would continue to accumulate, and fire intensity and severity would continue to increase. Instead of utilizing natural barriers, roads, or trails to achieve protection objectives as well as accomplishing resource objectives, additional fire line construction would occur, and in the long term suppression costs would increase compared to the proposed action.

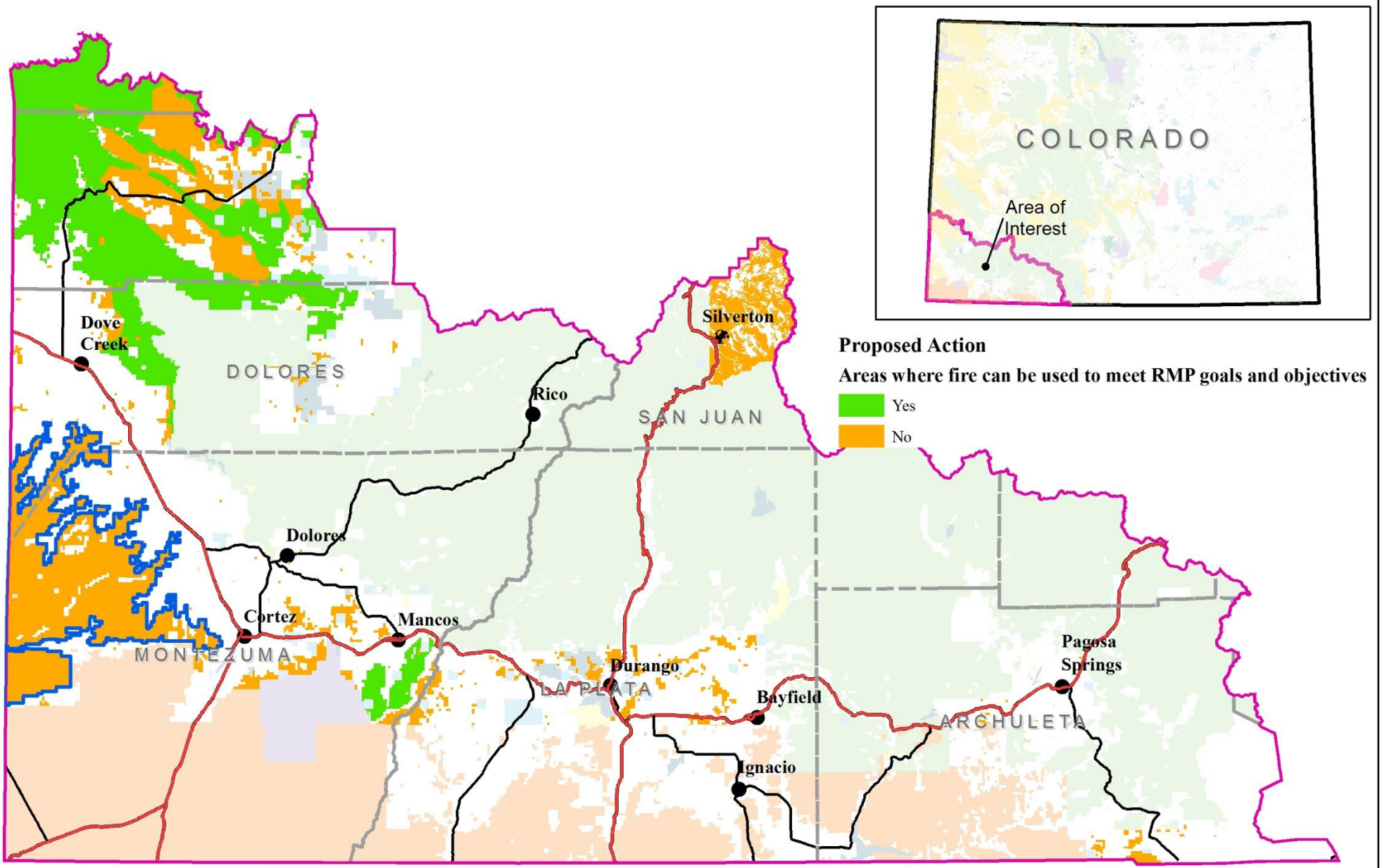

Figure 2.1: Tres Rios Field Office and Canyons of the Ancients National Monument Proposed Action Area (in green)

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0 5 10 20 30 40 Miles

Area	Acres
Use of fire **not** emphasized to meet RMP goals and objectives	371,353.4
Use of fire emphasized to meet RMP goals and objectives	304,450.6

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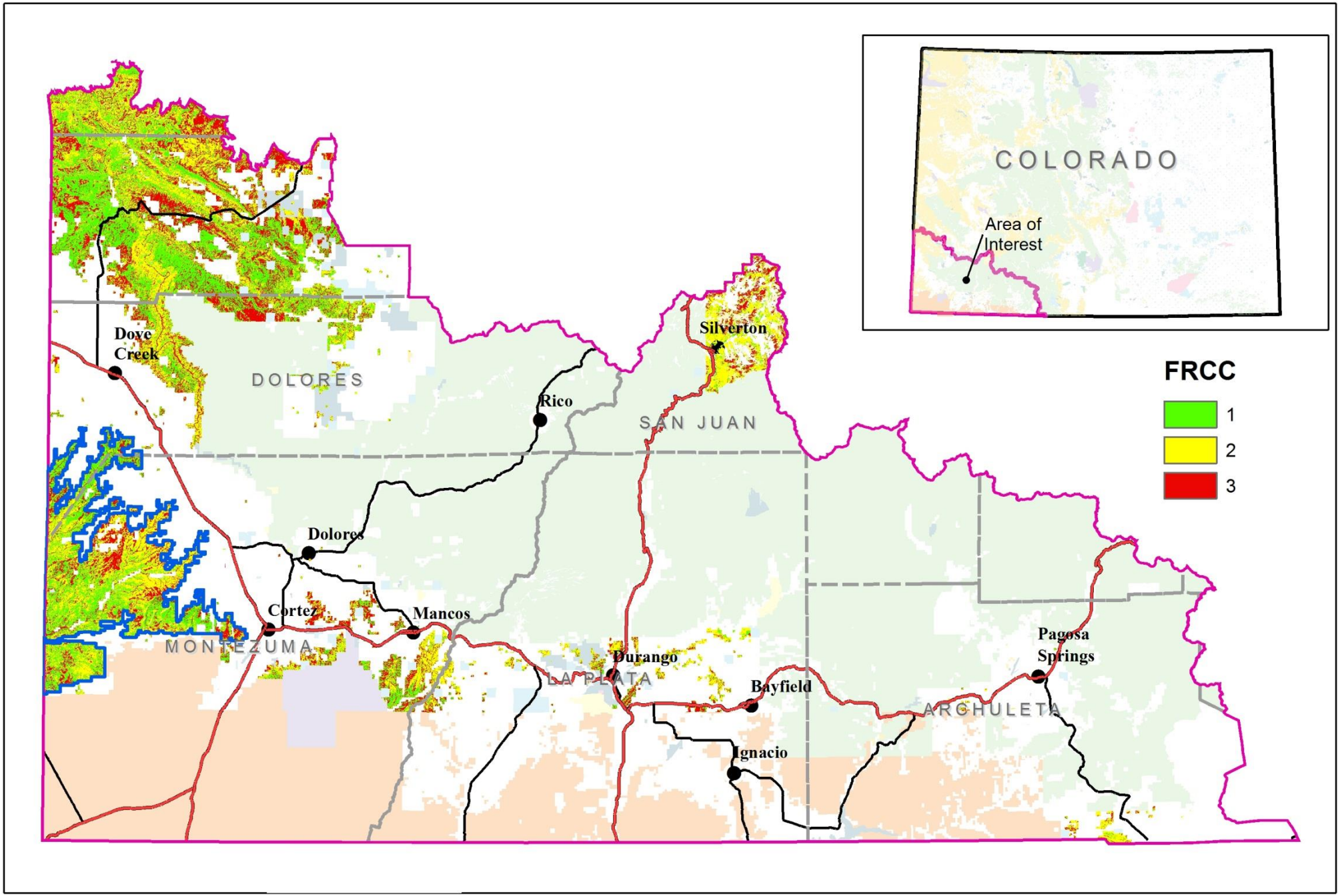

Figure 2.2: Fire Regime Condition Class Mapping Tool
Fire Regime Condition Class for TRFO and CANM

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2.4 Design Features of the Proposed Action

After providing for the safety of all responders and public, as well as evaluating and mitigating any risks to non-BLM land and any real property or improvements, the following design features apply to all actions which would be authorized under this EA, including any action required to manage fire, including access to fire areas. If the following design features cannot be met while at the same time ensuring the BLM's first objective of firefighter and public safety, the proposed action would not be authorized.

2.4.1 Soils and Water-Dependent Features

1. Exposure, compaction, and disturbance of soils would be minimized to the extent possible from burning activities. Examples of where exposure, compaction, and disturbance can be an issue include large contiguous areas of soils high severity burns (especially over sensitive or erosive soils), emergency stabilization and post-fire rehabilitation (ESR), fire line construction.
2. If burn activities occur in municipal/public supply public water supply management organizations would be notified at the earliest possible timeframe.
3. Areas of soil disturbance necessary for burn activities would be rehabilitated and/or stabilized as soon as possible following the fire, preferably within days or weeks after burning has ceased. This would be necessary to limit exposure to erosion events such as monsoonal storms or other runoff events.
4. Riparian areas, wetlands, springs, seeps, and perennial streams and intermittent streams with riparian vegetation are very rare and ecologically important features within CANM and TRFO and also tend to be areas of cultural importance. These features will be protected from fire under the Proposed Action alternative. Maps will be made and updated over the life of this EA indicating known riparian areas, wetlands, springs, seeps, perennial streams and intermittent streams with riparian vegetation.
5. In the event there may be ecological benefit to allowing fire to enter these features in (4) above, a hydrologist and/or ecologist would be consulted for site specific design or protection measures.

2.4.2 Fire Management

1. The proposed action would only be implemented under conditions which are conducive to meeting resource objectives as stated in the TRFO and CANM RMP's. These conditions occur during times of the year when 5 day average Energy Release Components of NFDRS Fuel Model G are below the 85th percentile (ERC-G 76 Upper Zone, ERC-G 78 Lower Zone)
2. BLM would assign a dedicated Resource Advisor (READ or REAF) to the incident in order to ensure resource objectives are being met. The use of resource advisors would be essential to implementation of the Proposed Action, and would allow management decisions to be made with the full use of available information and best management practices while allowing fire management activities to continue without increased risk on firefighters and public or incurring excessive cost.
3. A protection geodatabase would be created and maintained by the fire management staff which identifies specific information regarding avoidance and protection measures. This

geodatabase would be consulted by the Fire Duty Officer and Line Officer during the initial decision making process of determining a strategy for any ignition.

2.4.3 Cultural Resources

1. National Register listed and eligible cultural resources would be avoided by fire suppression actions that could adversely affect them (construction of fire control lines, off-road vehicle travel, and retardant drops). National Register listed and eligible cultural resources with features vulnerable to fire would be protected.
2. The use of any heavy equipment (such as bulldozers) requires Agency Administrator approval prior to use, along with a fireline qualified Archaeologist during dozer line scouting and construction.

2.4.4 Wildlife

2.4.4.1 New Mexico Meadow Jumping Mouse

1. In conjunction with a BLM wildlife biologist completely avoid riparian areas that meet minimum habitat requirements for New Mexico meadow jumping mouse within Montezuma, La Plata and Archuleta counties in Colorado.

2.4.4.2 Southwestern Willow Flycatcher

1. Willow-riparian patches near water of at least 30x30x5 feet tall, and at least .25 acres or larger will be completely avoided.

2.4.4.3 Gunnison Sage-grouse Critical Habitat

1. The proposed action should not occur if access to the site is required through Gunnison sage-grouse occupied critical habitat from March 1 - July 15, to protect lekking and nesting, and, December 1 - March 15th, to protect winter habitat.
2. In Sage-grouse unoccupied critical habitat, in consultation with a Wildlife Biologist, areas that are predominantly sagebrush should be avoided to the extent possible. Additionally, if fire behavior is such that sagebrush understory is being burned so that habitat no longer meets the primary constituent elements for Gunnison Sage-grouse, fire objectives should be moved towards suppression.

2.4.4.4 Bald and Golden Eagles

1. Any known or discovered bald and golden eagle roost or nest sites would be avoided by any action conducted under the proposed action to the extent practicable by ½ mile.
2. Cottonwood galleries would be avoided to maintain adequate roosting habitat for eagles.

2.4.4.5 Migratory Birds - Raptors

1. Fire managers would work with a BLM biologist to avoid raptor nest sites in ponderosa pine.

2.4.5 Lands/Access

1. Fire managers would work with a BLM Realty Specialist in conjunction with the proposed action geodatabase to implement protection measures on infrastructure, improvements, and rights of way to avoid damage.

2.4.6 Rangeland Management

1. Fire managers would avoid damage to rangeland improvements when implementing fires under the proposed action.
2. Livestock grazing use should be deferred following the proposed action, until recovery objectives are met or it is demonstrated that such use would not be detrimental.
3. Resource Advisors would work with affected permitees during implementation of the proposed action.

2.4.7 Noxious and Invasive (non-native) Weed Species

1. Post fire monitoring and treatment of noxious weed species will occur within burned areas.

2.4.8 BLM Special Status Plant Species

1. Known populations of BLM special status plant species populations would be avoided by fire suppression actions that could adversely affect them (construction of fire control lines, off-road vehicle travel, and retardant drops). Known populations of BLM special status plant species that are vulnerable to fire would be protected.

CHAPTER 3: AFFECTED ENVIRONMENT

3.1 Introduction and General Setting

The affected environment was considered and analyzed by an interdisciplinary team.This chapter provides a description of the human and natural environmental resources that could be affected by the Proposed Action. The impacts of the Proposed Action on the affected environment are described in Chapter 4.

The total area of the planning area is 675,804 acres which includes approximately 503,600 surface acres which are managed under the 2015 Tres Rios Field Office Resource Management Plan, and approximately 172,204 surface acres managed in the Canyons of the Ancients National Monument under the 2010 Canyons of the Ancients National Monument Resource Management Plan.

3.2 Soils and Water Dependent Features

The TRFO and CANM watersheds are primarily located within the Colorado Plateau with a smaller proportion of watersheds located in the Southern San Juan Mountains. Colorado Plateau watersheds are comprised of geology and soils derived from sedimentary rocks. These areas typically characterized by plateaus dissected by canyons and valleys. The Colorado Plateau is in a semi-arid climate zone. The area experiences periods of drought and irregular precipitation, relatively warm to hot growing seasons, and long winters with sustained periods of freezing temperatures. Most precipitation occurs during the winter and also during summer monsoon rains.

Water is a scarce and important resource for TRFO within the Colorado Plateau and for CANM water-dependent features such as perennial streams, seeps and springs. Their associated water-dependent riparian and wetland ecosystems are somewhat rare on the landscape. Riparian and wetland ecosystems on TRFO and CANM are not fire-dependent ecosystems and negative impacts can be significant if they burn. Water is also important to communities adjacent to TRFO and CANM. The Town of Dove Creek public water supply is located on BLM lands, as are many small single-owner water diversions.

Past and current land management plays an important role in watershed conditions on TRFO and CANM. The majority of BLM lands on TRFO and CANM are leased for minerals development. Oil and gas development and associated infrastructure can be dominant features in some watersheds. Current and historic livestock grazing have had long-term effects to watershed conditions in some BLM areas, and typically have direct impacts on a large proportion of riparian and wetland ecosystems within the analysis area located within the Colorado Plateau and lower elevations of the Southern San Juan Mountains.

Roads are recognized as significant causal agents of watershed impacts (Croke and Hairsine, 1999; Lane and Sheridan, 2002). Roads and road densities can be a good indicator of watersheds which have also had high levels of anthropogenic impacts. This is because the need to construct roads and develop high road densities is often associated with land management activities. Oil, gas, and other minerals development and recreation are typical reasons to construct high road

densities on TRFO. Table 3.2.1 is a summary of the watersheds with the highest road densities on the TRFO and these watersheds are shown in Figure 3.2.1 as rose colored polygons.

Table 3.2.1: Watersheds with the highest road densities on the Tres Rios Field Office.	
Watershed Name	**Miles Road Per Square Mile of Watershed**
Hamilton Creek-Naturita Creek	6.39
Narraguinnep Canyon-Alkali Canyon	5.88
Trail Canyon-McElmo Creek	5.86
Bull Canyon	5.19
East Paradox Creek	4.54
Dolores Canyon-Nicholas Wash	3.67
Dry Creek Canyon	3.48
Outlet Disappointment Creek	3.41
West Fork Dry Creek	3.34
Summit Canyon	3.26
Headwaters East Canyon	3.08
Big Gypsum Creek	3.04
Little Gypsum Creek-Dolores River	3.02
Chico Creek	3.00
Bush Canyon	2.99
Alkali Canyon	2.91
Island Canyon-Coyote Wash	2.57
Salt Creek	2.49
Horse Range Spring	2.40
Headwaters Cross Canyon	2.34
Gypsum Gap-Disappointment Valley	2.34
Peterson Creek-Navajo River	2.31
Broad Canyon	2.12
Joe Davis Hill-Dolores River Canyon	2.11
Dove Creek	2.09

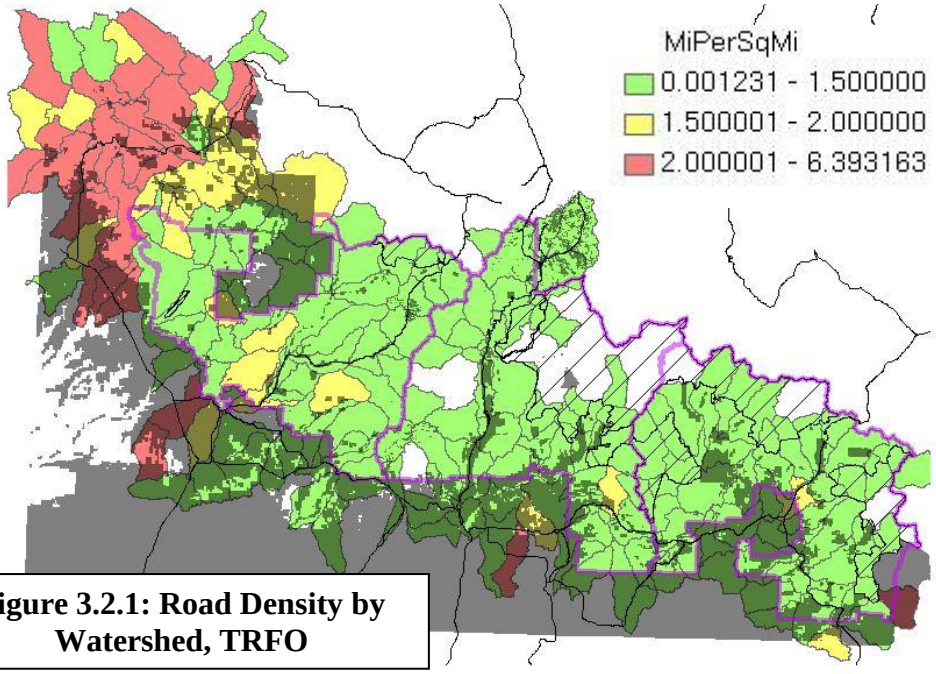

Figure 3.2.1: Road Density by Watershed, TRFO

In addition to the highest road densities on TRFO, some of these watersheds also have a high percentage of watershed area comprised of saline soils indicating they are at higher risk of having water quality problems (TRFO RMP Appendix I, Table I.3 Tres Rios Office Watersheds with Potential Salinity Issues). These watersheds are Hamilton Creek-Naturita Creek, Narraguinnep Canyon-Alkali Canyon, Outlet Disappointment Creek, West Fork Dry Creek, Gypsum Gap-Disappointment Valley, and Broad Canyon. For this analysis, these are the watersheds where large-scale high severity burns would likely have the largest cumulative effects.

3.3 Vegetation

The Tres Rios Field Office and Canyons of the Ancients National Monument have extremely varied climate, topography, and vegetation. Within the planning area, approximately 639,093 acres are vegetated, with the remaining 36,711 acres being sparsely or non-vegetated. The vegetated areas can be classified into three major groups: grasslands, shrublands, and forested lands (Tables 3.3.1, Figure 3.3.1). These groups were classified using LANDFIRE 2012 Existing Vegetation Type data (LANDFIRE, 2013), with local adjustments.

Table 3.3.1 Vegetation Classification within Planning Area

Vegetation Group	Total Acres	% of Acres
Forested	389,367.22	57.62%
Shrubland	190,267.35	28.15%
Grassland	59,458.42	8.80%
Sparsely Vegetated	36,711.04	5.43%
Grand Total	**675,804.03**	**100.00%**

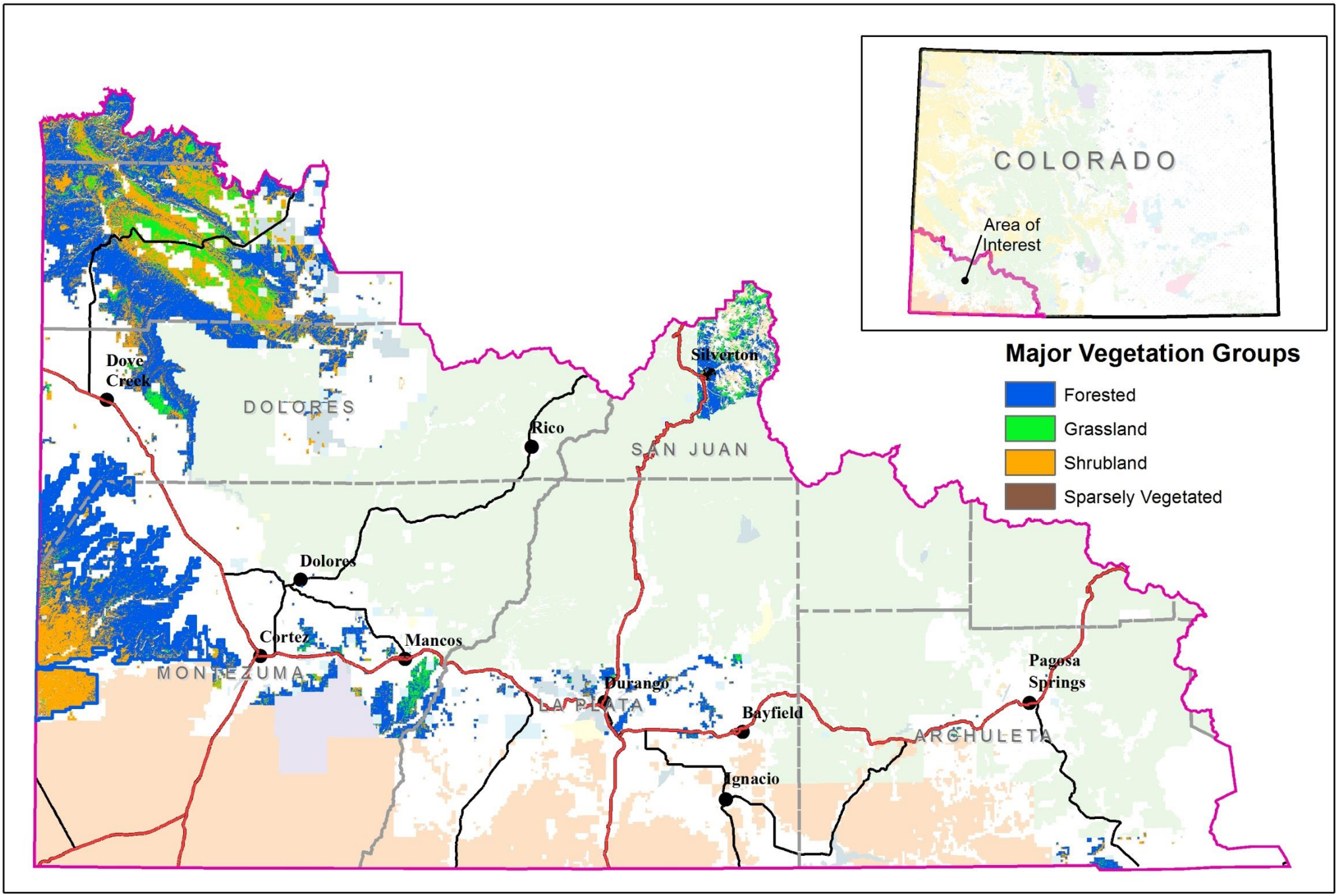

Figure 3.3.1: Major Vegetation Groups

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3.3.1 Forested Lands

The Planning area contains 389,367 forested acres, with the majority being classified as Pinyon-Juniper Woodland (Table 3.3.2, Figure 3.3.1).

Table 3.3.2 Forested Vegetation Types within Planning Area		
EVT Group Type	**Acres**	**% of Forested Acres**
Pinyon-Juniper Woodland	314,012.91	80.65%
Ponderosa Pine Woodland	18,288.93	4.70%
Spruce-Fir Forest and Woodland	16,945.46	4.35%
Western Riparian Woodland and Shrubland	13,179.68	3.38%
Douglas-fir-Ponderosa Pine-Lodgepole Pine Forest and Woodland	11,782.83	3.03%
Aspen Forest, Woodland, and Parkland	9,507.75	2.44%
Other Forest Lands (<1% cover each)	5,649.66	1.45%
Grand Total	**389,367.22**	**100.00%**

From the above table, the vast majority of forested vegetation types within the planning can be grouped into Pinyon-Juniper Woodland, Ponderosa Pine Woodland, or Spruce-Fir Forest and Woodland. For the purposes of this analysis, these three forest types will be further analyzed, as they represent the vast majority of the burnable acres within the planning area where fire has historically been one of the main disturbance agents. The acres classified as Western Riparian Woodland and Shrubland can all be further classified as Rocky Mountain Montane Riparian Forest and Woodland, and are typically directly adjacent to ephemeral or perennial water sources. Even so, from a fire ecology standpoint, the riparian areas are only likely to have fire if it is imported from adjacent vegetation types. Even in this scenario, fire is still not the dominant disturbance type for riparian areas. The remaining vegetation types occur as small patches within the aforementioned dominant types.

3.3.1.1 Pinyon-Juniper Woodland

Pinyon-juniper woodland is the most common vegetation type within the planning area, occurring on 314,000 acres (LANDFIRE, 2013). Colorado Plateau Pinyon-Juniper Woodland occurs on elevations between 6,000 and 7,500 feet. It is found throughout the mesa/plateau and canyon terrain typical of the western half of the planning area. The sites tend to be dominated by pinyon pine (*Pinus edulis)* and juniper (typically *Juniperus osteosperma*, although some *Juniperus scopulorum* occurs to a much more limited extent), with canopy cover ranging from ten to forty percent. Stands are very diverse in age, with some consisting of all single aged trees, and some with multiple age classes present. Dominant trees within a stand average 400 years, but trees 800-1.000 years old have been recorded (Mehl, 1992).

In areas of denser canopy cover, understory is typically sparse. Where understory vegetation does exist, it is typified by scattered muttongrass (*Poa fenderiana).* As the canopy cover decreases, understory vegetation becomes more diverse, including perennial grasses such as western wheatgrass *(Pascopyrum smithii)*, bottlebrush squirreltail *(Elymus elymoides)*, Indian

ricegrass *(Achnatherum hymenoides)*, needle-and-thread *(Hesperostipa comata)* and junegrass *(Koeleria asiatica)*. Shrubs begin to increase in the understory with canopy cover reduction, and include big sagebrush *(Artemisia tridentata)* or black sagebrush *(Artemisia nova)*, as well as antelope bitterbrush *(Purshia tridentate)*, Utah serviceberry *(Amelanchier utahensis)*, Gambel oak, (*Quercus gambelii)*, true mountain mahogany *(Cercocarpus montanus)* and rabbitbrush *(Chrysothamnus Nutt.)*. Some sites within the planning area have limited canopy cover, but no understory growth. These sites are typically low elevation and rocky, and feature cryptobiotic soil crusts.

Disturbance history in pinyon-juniper woodland is a co-dominant relationship between mixed severity fire, replacement fire, insect disturbances, and weather related stressors such as long term drought. While not dependent on long term drought for mixed severity or replacement fire, drought cycles do increase stress on both pinyon and juniper trees, and in the case of pinyon pine make them more susceptible to beetle infestations, as has been occurring in the planning area since the early 2000's. In turn, the beetle killed trees increase surface fuel loading, increasing the likelihood of mixed severity (rather than replacement) fire.

3.3.1.2 Ponderosa Pine Woodland

Ponderosa pine (*Pinus ponderosa* var. *scopulorum)* woodland occurs on 18,288 acres of the planning area, at elevations between 7,000 to 9,500 feet, on flat to gently sloping soils. At the lower elevation limit of ponderosa pine in the planning area, stands intermix with pinyon-juniper woodlands and mountain shrublands. In most ponderosa pine stands within the planning area, Gambel oak (*Quercus gambelii)* is the dominant shrub within the understory, but mountain mahogany *(Cercocarpus montanus)*, serviceberry *(Amelanchier spp.)*, buckbrush *(Ceanothus fendleri)*, bitterbrush *(Purshia tridentate)*, Oregon grape *(Mohonia repens)* snowberry *(Symphoricarpos rotundifolius)*, and fringed sagebrush *(Artemisia frigida)* are also present. Native grasses within stands may include Arizona fescue *(Festuca arizonica)*, parry oatgrass *(Danthonia parryi)*, mountain muhly *(Muhlenbergia montana)* and pine dropseed *(Blepharoneuron tricholepis)*, along with the forb species western yarrow *(Achillea millefolium)*, northwest cinquefoil *(Potentilla gracilis)*, hairy goldenaster *(Heterotheca villosa)* and Fendler sandwort *(Arenaria fendleri)*. While there are some suggestion that Gambel oak was not as extensive or abundant prior to 1870, and has spread to its' current extent because of fire exclusion from the landscape, most available evidence indicates the contrary. Gambel oak was likely always a critical part of the ponderosa pine woodland ecosystem in the planning area, as evidenced by historic travelogues, such as those of the Dominguez/Escalante expedition in 1776, early silvical reports from the San Juan National Forest, as well as photos of pine forests from the early 20th century (Romme, et. al, 2009).

On more mesic sites such as north aspects or higher elevations, this vegetation type can intermix with mixed conifer types. Douglas fir (*Pseudostuga menziesii*), and quaking aspen (*Populus tremuloides*) become more common in these sites, and because of the typically higher moisture content of soils, they historically burn less frequently than xeric ponderosa pine sites. Within and adjacent to some patches of upper elevation mixed conifer, stands of nearly pure aspen can occur, but are spatially extremely limited within the planning area.

Ponderosa stands throughout the planning area are typically even aged (60-80 years old), given the extensive logging that occurred throughout the early to middle part of the 20th century. Even so, a few old growth stands exist, as well as pockets of seedlings generated from repeated prescribed fire applications. Within the planning area, the largest unbroken ponderosa pine stands are located on the western rim of the Dolores River canyon. Other clusters occur on the tops of Weber and Menefee Mountains, and on BLM land surrounding Durango and Bayfield. With the exception of the Weber and Menefee Mountain pine stands (due to lack of access and location within a WSA), the majority of ponderosa pine within the planning area has had some form of prescribed fire or mechanical vegetation treatment applied in the last twenty years.

3.3.1.3 Spruce-Fir Forest and Woodland

Within the planning area, the 16,945 acres of Spruce-Fir forest and woodland occur at elevations between 8,500 and 11,000 feet surrounding Silverton, Colorado. These are the coldest and wettest forest types within the planning area, and annual precipitation averages from 31 to 43 inches per year, predominantly in the form of snow.

This forest type is dominated by Englemann spruce (*Picea engelmannii*) and subalpine fir (*Abies lasiocarpa*), and can be quite variable in structure and composition due to environmental variability (Romme, et. al, 2009). Ground vegetation is highly variable within this forest type, and can include many herbs and shrubs. At the lowest elevations, Douglas fir and white fir (*Abies concolor*) intermix with the dominant forest species, and at the highest elevations, Englemann spruce can occur alone. Throughout this forest type, aspen occur either as small clumps, or in larger groups.

Within the planning area, the spruce bark beetle (*Dendroctonus rufipennis*), has impacted approximately 1,783 acres of Spruce-Fir forest (10.5%) since 1996 (USDA Forest Service, Forest Health Protection and its partners, 2014). Adjacent to the planning area, the Gunnison Field Office, Rio Grande National Forest, and San Juan National Forest have experienced spruce mortality over a much greater area. This beetle attacks mid and overstory trees, while leaving sapling and pole trees unaffected.

3.3.2 Shrublands

186,967 acres of the planning area are classified as a shrubland vegetation type (Table 3.3.3). This analysis will focus on the two vegetation types in which fire is the predominant disturbance agent; Sagebrush Shrubland and Steppe, and Deciduous Shrubland.

Table 3.3.3 Shrubland Vegetation Types within Planning Area

EVT Group Type	Acres	% of Shrubland Acres
Sagebrush Shrubland and Steppe	111,942.18	58.83%
Salt Desert Scrub	57,654.05	30.30%
Mountain Shrubland	14,356.49	7.55%
Other Shrublands (<1% cover each)	6,314.63	3.32%
Grand Total	**190,267.35**	**100.00%**

While Salt Desert Scrub occupies nearly 60,000 acres of the planning area, its' presumed historical fire return interval is between 500 and 1,000 years. This vegetation type is found on the bottom of two of the low valleys of the planning area (Disappointment Valley and Big Gypsum Valley), outside of the proposed action fire emphasis area. Since the fire return interval is so long in this vegetation type, and the vegetation type occurs outside of the proposed action fire emphasis area, for the purposes of this analysis Salt Desert Scrub will not be analyzed in depth.

Most of the other shrubland vegetation types within the planning area occur as islands within either Sagebrush Shrubland and Steppe or Deciduous Shrubland, with the exception of the riparian vegetation types, which occur along waterways at low elevations.

3.3.2.1 Sagebrush Shrubland and Steppe

Sagebrush Shrubland and Steppe occurs on the western half of the planning area at elevations between 5,000 and 7,500 feet. Occurring in semiarid and lower montane climate zones, the dominant species is one of three types of sagebrush depending on soil type and annual average precipitation amount. Near valley floors on deeper soils, basin big sagebrush (*Artemisia tridentata spp. tridentata*) communities occur. In shallower, more alkaline soils, black sagebrush (*Artemisia nova*) occurs. In upland landscape areas, Mountain big sagebrush (*Artemisia tridentata spp. vaseyana*) is the dominant sagebrush type. Within the planning area these sites occur adjacent to and intermixed with each other. In some areas, big sagebrush communities are dominant with shallow soil areas dominated by low sagebrush, but in others low sagebrush is the dominant plant with big sagebrush present only in the lowest of drainage bottoms, where soils are deep.

Healthy sagebrush shrubland and steppe is typified by one of these three species of sagebrush occurring over 10-40% of an area, with perennial grasses and forbs covering up to 25%. In the northwest portion of planning area, the largest extent of this vegetation type occurs in Dry Creek Basin. This vegetation type is also prolific near the lower elevations of Disappointment Valley, Big Gypsum Creek, Coal Bed Creek, and lower elevations of Canyons of the Ancients National Monument. Sagebrush shrubland and steppe are extremely important habitat for the threatened Gunnison Sage Grouse; occupied habitats within the planning area fall within this vegetation type in Dry Creek Basin satellite population and in the Dove Creek/Monticello satellite population.

Sagebrush in the planning area was more widespread prior to the settlement period of the late 1800's. Sagebrush in upland areas with deep soils was converted to agricultural land over a large extent, which disrupted its' fire regime by fragmenting the landscape as well as introducing the policy of fire suppression. These two factors have allowed for Pinyon/Juniper Woodland and Deciduous Shrubland to expand into what was formerly expansive sagebrush shrubland and steppe. Historically, a shorter fire regime interval in sagebrush shrubland and steppe relative to pinyon/juniper woodland would have eliminated tree seedlings and promoted sagebrush.

In areas of CANM burned in the past 15 years, sagebrush response is dramatic in what was formerly Pinyon/Juniper Woodland. While the vegetation would likely be classified as an early successional stage of Pinyon/Juniper Woodland, sagebrush in some burned areas is in excess of 3 feet tall, with a healthy understory of perennials. The most notable example of this is within the 1996 Squaw Canyon fire footprint, near Lowry Ruin.

3.3.2.2 Mountain Shrubland

Mountain shrubland within the planning area falls within three types, but the vast majority (92.7%, 13,247 acres) is classified as Quercus gambelii Shrubland Alliance. This vegetation type generally occurs on hills and mesas, on slopes ranging from nearly flat to in excess of 30%. Elevation ranges from 6,500 to 8,500 feet. This site tends to be dominated by Gambel oak (*Quercus gambelii*), Utah serviceberry (*Amelanchier utahensis*), curlleaf mountain-mahogany (*Cercocarpus ledifolius*) and cliff fendlerbush (*Fendlera rupicola*). Associated perennial grass species may include western wheatgrass (*Pascopyrum smithii*), muttongrass (*Poa fendleriana*), bottlebrush squirreltail (*Elymus elymoides*), mountain muhly (*Muhlenbergia montana*) and Arizona fescue (*Festuca arizonica*). Sagebrush may be present in the understory, especially in areas where mountain shrubland has invaded former sagebrush sites.

Within the planning area, the most extensive mountain shrublands are on the west side of the Dolores River Canyon, adjacent to ponderosa pine and pinyon/juniper woodlands. Other areas that mountain shrubland occupies are within and adjacent to the Weber and Menefee Mountain WSA's, many slopes near Durango, and in some areas of Canyons of the Ancients National Monument. Similar in some aspects to sagebrush's altered disturbance regime, fire, which is the key disturbance to this vegetation type, has been removed from the landscape by site conversion and fire suppression policies. However, mountain shrubland responds differently than sagebrush to fire exclusion, and has expanded into areas formerly dominated by sagebrush. While some tree invasion has occurred on mountain shrublands, the longer fire return interval has not been as altered as that of sagebrush shrubland, and this tree invasion is probably not outside of the historical range of variability.

3.3.3 Grasslands

Grassland vegetation types represent approximately 60,000 acres of the planning area (Table 3.3.4). Of those acres, over half are classified as being composed of introduced species uncharacteristic of pre-European settlement conditions.

Table 3.3.4 Grassland Vegetation Types within Planning Area

EVT Group Type	Total Acres	% of Grassland Acres
Introduced Grasslands	32,419.34	54.52%
Grassland	13,223.81	22.24%
Dry Tundra	8,529.88	14.35%
Western Herbaceous Wetland	3,066.58	5.16%
Other Grasslands (<1% cover each)	2,218.81	3.73%

Grand Total	**59,458.42**	**100.00%**

This analysis will focus on the vegetation types in which fire historically has been, or presently could be a significant disturbance; Introduced Grassland, Mountain Grasslands, and Semi-Desert Grasslands (both contained within EVT Group "Grassland").

3.3.3.1 Introduced Grasslands

LANDFIRE classifies 32,419 acres of the planning area as Introduced Grasslands. These are located primarily in the bottom of Disappointment Valley and Dry Creek Basin, areas which fall outside of the proposed action fire emphasis areas. In some of these areas, the non-native Kentucky bluegrass (*Poa pratensis*) occurs over large areas in high cover percentages, displacing native species and disrupting historical disturbance processes. In other areas, crested wheatgrass (*Agropyron cristatum*), intermediate wheatgrass (*Thinopyrum intermedium*), orchardgrass (*Dactylis glomerata*), smooth brome (*Bromopsis inermis*), or timothy (*Phleum pretense*) were purposely planted in the past in order to improve forage conditions for livestock, or to revegetate disturbed sites (Romme, et. al, 2009). Other introduced grasslands within the planning area include cheat grass (*Bromus tectorum*). This invasive weed does not dominate vast areas within the planning area as it does within sites in the Great Basin region, but rather is localized next to roads and in small patches (100 ft^2 or less) throughout the lower elevations of the planning area.

3.3.3.2 Mountain Grasslands

At elevations between 7,500 and 11,600 feet in montane and subalpine climate zones, mountain grasslands occur within and adjacent to other vegetation types.

Near the lower elevation of their range (7,500 to 9,000 feet) they occur as meadows within and adjacent to other forest and shrubland vegetation types, usually no more than a few acres. These lower elevation mountain grasslands are dominated by Arizona fescue (*Festuca arizonica*) and occur as clearings within ponderosa pine, mixed conifer, or aspen vegetation types. These grasslands are heavily impacted by livestock grazing in some areas, as evidenced by a decreased cover of fescue, more bare soil, and less litter. In prime ecological condition, these grasslands would have a high cover of fescue with abundant litter and little bare soil (Romme et. al, 2009).

Between 8,500 and 11,600 feet and associated with more cool-moist forest types like spruce-fir forest and woodland, mountain grasslands are dominated by Thurber fescue (*Festuca thurberi*). Site descriptions are very similar to the Arizona fescue dominated grasslands, with high quality sites showing high fescue cover, minimal bare soil, and a relatively high litter load.

In areas impacted by sustained livestock grazing, Kentucky bluegrass occurs along with other non-native and invasive species. These areas have relatively low litter amounts, high bare soil percentages, and sites are susceptible to erosion, compaction, and weed invasion.

3.3.3.3 Semi-Desert Grassland

These grasslands occur at lower elevations than Mountain Grasslands, typically between 4,500 and 7,000 feet. Both cool and warm season grasses dominate these sites, such as needle and thread (*Hesperostipa comata*), Indian ricegrass (*Achnatherum hymenoides*), galleta (*Pleuraphis*

sp.), western wheatgrass (*Pascopyrum smithii*), blue grama (*Bouteloua gracilis*), purple threeawn (*Aristida purpurea*), sand dropseed (*Sporobolus cryptandrus*), and alkali sacaton (*S. airoides*). Biological soil crusts are major components on the ground surface. Within the planning area, the low, broad valleys on the northern end of the field office play host to the majority of this vegetation type, though it also occurs near the lower elevations of CANM.

3.4 Fire Management & Fire Ecology

In the past twenty years (1994-2015), 758 wildfires have burned 17,304 acres of the planning area. Over the same time span, 6,223 acres have had prescribed fire applied, as well as 21,956 acres of mechanical vegetation treatment (Figure 3.4.1).

In the past twenty years, very few fires have been managed to meet resource objectives as defined in a resource management plan within the planning area. The acreage burned in wildfire represents fires which were managed with an emphasis on protection objectives, and minimizing acreage burned. The ten largest fires (1.3% of all fires) within the planning area represent 13,568.1 acres burned (78.41% of all acres) (Table 3.4.1).

Table 3.4.1 Largest Wildfires In Planning Area, 1994-2014

Fire Name	Year	Final Fire Size (ac.)	BLM Within Fire Perimeter (ac.)	Percentage of Total BLM Burned	Cause
Weber	2012	10,142.60	7,308.80	42.24%	Human
Hamilton	2003	3,211.30	2,293.40	13.25%	Lightning
Burn Canyon	2002	30,321.60	1,656.50	9.57%	Lightning
Hovenweep	2000	1,077.50	827.20	4.78%	Lightning
Squaw Canyon	1996	598.60	473.80	2.74%	Lightning
Bircher	2000	22,427.60	434.90	2.51%	Lightning
Little Cahone	2008	202.90	163.30	0.94%	Lightning
Bridge	1998	161.10	161.10	0.93%	Lightning
Trail East	2005	2,527.20	128.60	0.74%	Lightning
Goodman	2007	139.70	120.50	0.70%	Lightning
Totals			**13,568.10**	**78.41%**	

The vast majority of fires in the planning area are caused by lightning before and during the annual southwest monsoon. Fire danger indices peak in mid to late June, then moderate with the onset of the monsoons in early July. Initial attack activity peaks in mid-July, just as the monsoon nears peak activity. The largest fire within the planning area, the Weber Fire, was human-caused in late June of 2012, one of the driest years on record in the area. Every other fire that has burned over 100 acres of BLM land within the planning area was lightning caused.

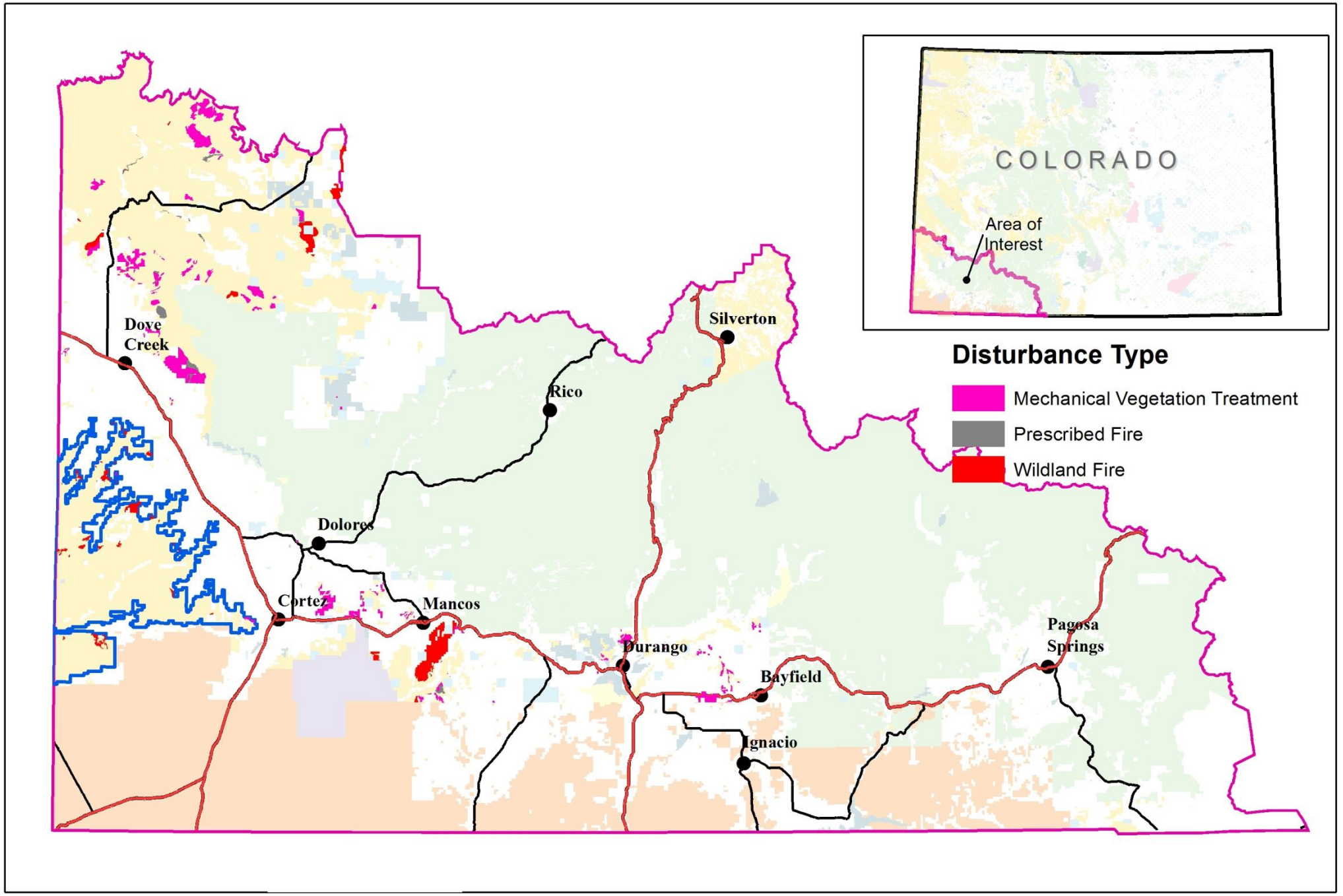

Figure 3.3.2: Disturbance History, 1994-2014

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3.4.1 Forested Lands

3.4.1.1 Pinyon-Juniper Woodland

Pinyon-Juniper Woodlands within the planning area are characterized by relatively infrequent mixed-severity fires, where fire mortality is between 25% and 75% of the overstory. Mean Fire Return Interval (MFRI), the average time on a site between fires under the historical fire regime, is 150 years for mixed-severity fire. Replacement fires, classified as high severity (over 75% overstory mortality) are more infrequent, with an MFRI of 200-500 years. Colorado Plateau Pinyon-Juniper Woodland did not historically experience low severity surface fire, in which overstory mortality is less than 25%, except in its' earliest succession class, which is dominated by small shrubs and an herbaceous layer, with an MFRI of 200 years (Rondeau, 2001).

Pinyon-juniper fires within the planning area are over 99.5% lightning caused. The most common type of fire representing the vast majority (>99%) of all fires in this vegetation type is a single tree, lightning caused fire. These fires have limited spread potential, and often burn themselves out before being detected or suppressed by firefighters. The other type of fire is a wind and fuel driven crown fire, where fire is moved through the canopy of the trees. These fires can exhibit rapid rates of spread and high flame lengths, as well as moderate to high severity, however they typically subside during the evening hours, when wind speeds die down and relative humidity values increase. This type of pinyon-juniper fire typically does not significantly spread after the first burning period, because of the scarcity of surface fuels, the discontinuity of canopy cover, and the short term nature of severe fire weather events, except in the most extreme of cases (Weber Fire, 2012, Bircher Fire, 2000). Given the extent of this vegetation type within the planning area, as well as the environment in which it typically occupies, this is the vegetation type which experiences the largest number of fires in the planning area, as well as sees the largest amount of acres burned.

While fire is an important disturbance in Pinyon-Juniper Woodlands, beginning in 2001, the planning area experienced a more widespread and far reaching disturbance in the *Ips confuses* beetle outbreak. This beetle infested Pinyon pines, resulting in mortality in excess of 90% across the planning area. The effect on fire ecology from the beetle epidemic was that there is less continuous canopy available to support high severity crown fire, yet more surface fuel loading. Less canopy cover allowed for an increase in the understory herbaceous and shrub composition, which increased surface fuel loading, tending to support mixed-severity fire types.

Fire Regime Condition Class (FRCC) is a classification of the amount of departure from the natural fire regime vegetation has experienced over a specific scale. The Fire Regime Condition Class Mapping Tool (FRCCmt) was used in order to create specific FRCC layers for the planning area (Figure 2.2, Table 2.1). Within the planning area, 43.58% of pinyon-juniper woodland is classified as FRCC 1, while the remainder falls almost evenly between FRCC 2 (27.54%) and FRCC 3 (28.88%). FRCC values within pinyon-juniper woodland are summarized below, in Table 3.4.2.

Table 3.4.1 Fire Regime Condition Class of Pinyon-Juniper Woodland		
Fire Regime Condition Class	**Total Acres**	**% of Acres**
FRCC 1	136,857.76	43.58%
FRCC 2	86,470.62	27.54%
FRCC 3	90,684.53	28.88%
Total	**314,012.91**	**100.00%**

Succession classes (S classes or SCLA) describe species composition, cover, and height ranges of different successional stages of a specific vegetation type. Disturbances such as fire can alter succession classes, either advancing or setting them back. Different vegetation types have different numbers of successional classes, and different proportions of each class. Two S classes, Uncharacteristic Exotic Vegetation, and Uncharacteristic Native Vegetation Cover/Structure/Composition, exist to show areas in which exotic vegetation or disturbances outside of the historical regime have occurred, altering vegetation from reference conditions. In Pinyon-Juniper Woodlands, there are 5 successional classes, A through E, as well as the aforementioned Uncharacteristic Exotic Vegetation (UE) and Uncharacteristic Native Vegetation Cover/Structure/Composition (UN). These successional classes are summarized below, along with predicted historic and observed current distributions (Table 3.4.2).

Table 3.4.2 Pinyon-Juniper Woodland Current and Historic Succession Class Distribution and Description			
Succession Class and Description	***Current Acres***	***Current %***	***Historic %***
Succession Class A *"Grass/forb/shrub/seedling - usually post-fire."*	3,085.04	0.98%	10%
Succession Class B *"Mid-development, dense (>40% cover) pinyon-juniper woodland; understory is sparse."*	15,270.62	4.86%	20%
Succession Class C *"Mid-development, open (<40% cover) pinyon-juniper stand with mixed shrub/herbaceous community in understory."*	59,695.40	19.02%	25%
Succession Class D *"Late-development, open juniper-pinyon stand with "savanna-like" appearance; mixed grass/shrub/herbaceous community."*	154,312.28	49.16%	35%
Succession Class E *"Dense, old-growth stands with multiple layers. Late-development, closed pinyon-juniper forest. May have all aged, multi-storied structure. Moderate mortality within stand. Occasional shrubs with few grasses and forbs and often rock or bare soil."*	44,471.04	14.17%	10%
Uncharacteristic Exotic Vegetation *Sites where environmental site data as well as*	1,425.32	0.45%	N/A

historical data indicate that Pinyon-Juniper was the dominant vegetation type, but are now supporting exotic vegetation, such as invasive or noxious weeds.			
Uncharacteristic Native Vegetation Cover / Structure / Composition *Sites in which disturbances have occurred outside of the historic range of variability, resulting in stand structures which are uncharacteristic of historical values. Examples include old chaining areas which now have sapling overstory, and selective thinning mechanical vegetation treatments, as well as others. Sites with >50% shrub cover are also captured in this category, even though they are prolific throughout the planning area.*	35,666.05	11.36%	N/A
Succession Class Descriptions in quotations from LANDFIRE, 2007			

Another important aspect of succession classification is that it approximates timelines from which to judge departure and the amount of time needed to move vegetation back towards reference conditions. A schematic of the vegetation dynamic model including timelines to move between S classes, disturbance types, and frequency of disturbance types is represented in Figure 3.4.2, below.

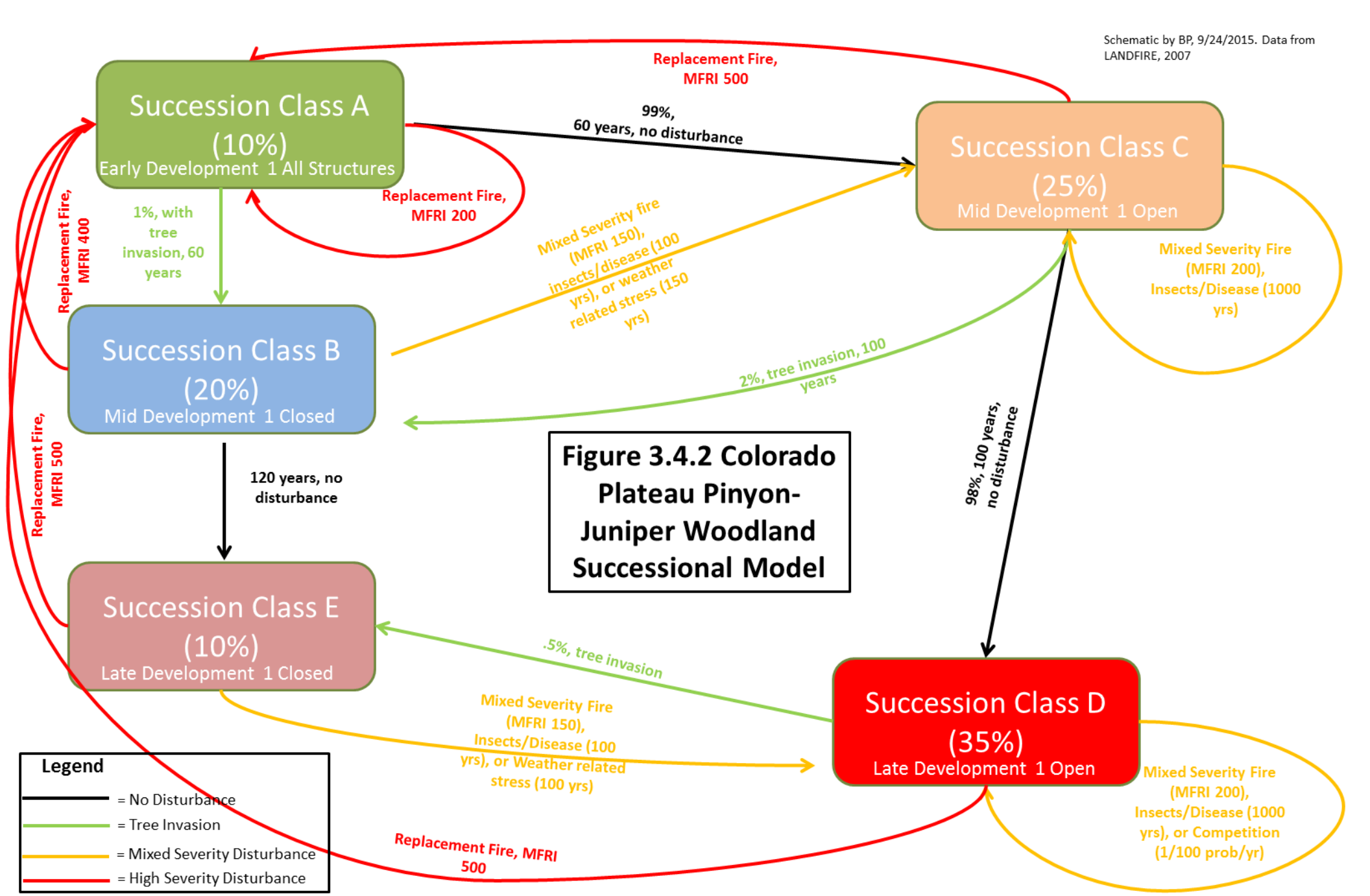


Figure 3.4.2 Colorado Plateau Pinyon-Juniper Woodland Successional Model

The above tables and figure indicate that within the planning area, the current distributions are below historic predicted values in both S classes A and B, near historic distribution in S classes C and E, and overrepresented in S class D. The underrepresentation of S class A (early development, typical of post-burn areas) is likely due to the fact that fire does not have the same opportunity to spread on the landscape it historically did. Fire importation is thought to be common in reference stands, which is when fire spreads into a stand from adjacent vegetation, but due to land use patterns such as Pinyon-Juniper woodland conversion to agricultural land, or adjacent vegetation types conversion to agricultural or range land, fire has a more limited opportunity to spread than under reference conditions. These factors also explain the FRCC spread, as FRCCmt takes into account S class as one of the inputs. A shift in S class from historic presumed values can alter the FRCC away from a 1, towards either FRCC 2 or FRCC 3, depending on how far away from historic presumed conditions observed S classes are.

S class D accounts for nearly half (49.16%) of the pinyon-juniper woodland within the planning area. This is largely due to the *Ips* beetle epidemic of the early to mid-2000's. The overall effect of such a large percentage (>90%) of pinyon mortality was to shift the old growth, closed canopy (41-70 %) stands (S class E) towards S class D, old growth, open canopy (10-40%) stands. Additionally, S class B (mid-development, dense) stands which were infested by the beetle would move towards S class C (mid-development, open), which can explain its' distribution as being near historic, as well as a reduction in S class B compared to presumed historic conditions. Beetle infestation within S class D stands would have maintained the stands within their current SCLA, as old growth, yet with open canopy.

While fire suppression may have altered stand structure and succession class within pinyon-juniper prior to 2000, the *Ips* outbreak likely changed stand structures in a much more widespread manner. The main legacy of fire suppression from the landscape would be most evident in the scarcity of S class A, early development, across the landscape. While this may be due to fire suppression in some manner, domestic livestock grazing has reduced the herbaceous fuels necessary to carry fire within S class A, as well as adjacent vegetation types from which fire could import.

In the past 20 years, 5,863 acres of Pinyon-Juniper woodland within the planning area have burned in wildfires. An additional 1,528 acres have been burned in prescribed fires, and 11,008 acres have been treated by mechanical means to achieve different resource objectives (roller chopping, mastication, thinning, or chaining). All fire disturbance combined comes to 7,364 acres total, averaging 368.2 acres per year. When combined with mechanical treatments, 18,372 acres of pinyon-juniper woodland have had some form of fire or mechanical disturbance in the past twenty years, averaging 918.6 acres per year. Under the presumed historic fire regime, approximately 1,083 acres per year may have burned, on average. While this does not account for the *Ips* epidemic, it does show that past wildfires, prescribed fires, and mechanical treatments do come close to replicating at a minimum the scale of the presumed historic fire regime. When combined with the *Ips* beetle epidemic, the scale of disturbance in the pinyon-juniper woodland within the planning area appears to be on a course similar to its' historic disturbance regime; however, the effects on succession class appear to be different than the presumed historic conditions, as referenced in Table 3.4.2.

The most likely cause of this is how LANDFIRE describes the S Class "Uncharacteristic Native Vegetation Cover/Structure/Composition (UN)" within this vegetation type. UN S Classes within Pinyon-Juniper woodland are automatically applied if shrub cover is >50%. While this may be rare across the extent of this vegetation type, within the planning area it is a relatively common occurrence, where mountain shrubland and pinyon-juniper woodland intermix.

Additionally, invasive species, specifically cheat grass *(Bromus tectorum),* are present in some pinyon-juniper sites where disturbance has occurred. Because of the amount of mechanical fuels treatments in the past, heavy machinery served as a vector of weeds, combined with the location of these treatments near roads where cars and off-road vehicles also served as vectors. However, aggressive weeds monitoring and treatment protocols seem to be keeping invasives mostly in check; extent and cover is not nearly at levels seen in other areas of the country with similar vegetation.

3.4.1.2 Ponderosa Pine Woodland

Multiple studies have identified fire as the primary disturbance agent of ponderosa pine stands throughout its' range. The fire regime of ponderosa pine stands within the planning area can be categorized as a mixed-severity, relatively short return interval regime, with elements of Fire Regimes I, II, and III. Ponderosa pine within the planning area shares similarities with regards to fire regime with both more southwestern sites, such as those in Arizona and New Mexico, as well as northern Colorado sites such as those located within the Front Range. While frequent surface fire was likely an important type of fire on the landscape, the presence of Gambel oak within the understory would often lead to mixed-severity (25-75% overstory mortality), and in drought conditions, high severity (>75% overstory mortality) fires. A study directly adjacent to the planning area on the San Juan National Forest identified fires as historically (pre-1880) occurring between every six and ten years in lower elevation ponderosa pine stands, with 57% of those fires occurring in the spring months. Fire activity was less between mid-June and mid-July (12%), and then picked up again from mid-July onwards (31% of all fires). Fires occurred more often during drought years, or two to three years after above average precipitation. Mixed-conifer stands had longer fire return intervals but similar fire severity, averaging 10-28 years between fires (Grissino-Mayer et. al, 2004).

Fire history in ponderosa pine in the planning area is relatively limited. While numerous ignitions have occurred, these were mostly quickly suppressed at a very small size. Lightning accounts for the vast majority of ignitions in this vegetation type. The one exception to this, accounting for most of the burned acreage of all forested vegetation types with the exception of pinyon-juniper, is the 2012 human caused Weber Fire, which burned 1,805 acres of Ponderosa pine on the flanks and top of Menefee Mountain. The majority of the ponderosa pine acres burned in this fire burned at a moderate severity, where mortality of the overstory was between 25% and 75%.

Within ponderosa pine stands in the planning area, approximately 25% is classified as FRCC 1, 7% as FRCC 3, and the remainder (62%) as FRCC 2 (Table 3.4.3). The most probable cause for the dominant FRCC 2 categorization is the exclusion of wildfire from the landscape for the past 120 years. In addition, heavy grazing and logging occurred in the early part of the 1900's across the general area, and many old growth trees were removed. While logging has ceased and

grazing practices are managed with much more focus on sustainability than in the past, the past impacts of these activities combined with fire exclusion have led to a moderate risk of losing key ecosystem components.

Table 3.4.3 Fire Regime Condition Class of Ponderosa Pine Woodland		
Fire Regime Condition Class	**Total Acres**	**% of Acres**
FRCC 1	4,547.71	24.87%
FRCC 2	12,487.59	62.28%
FRCC 3	1,253.63	6.85%
Total	**18,288.93**	**100.00%**

While fire is the primary change agent within pine stands, other disturbances, such as beetle epidemics or weather related mortality did occur. Historically the spatial extent of these disturbances would have been relatively limited. Currently, adjacent to the planning area on the Dolores District of the San Juan National Forest, a roundheaded pine (*Dendroctonus adjunctus*) beetle epidemic has caused somewhat extensive (upwards of 4,000 acres) mortality within dense stands of even aged ponderosa pine. The spatial extent of the beetle epidemic is probably without historical analog, as varying tree densities and age classes, associated with frequent fire return intervals, across the pine stand would have led to smaller patches of mortality, with some areas being missed entirely (Samman & Logan, 2000). Within the planning area, there is evidence on the western rim of the Dolores River canyon of roundheaded pine beetles, including small patches (2-3 trees) of mortality induced by the beetles. However, repeated monitoring has shown that the beetle is not advancing evenly across all ponderosa pine in the area; rather it infests 6-10 trees within a 2 to 5 acre area and then moves on without inducing stand-wide mortality. Overall, mortality caused by roundheaded pine beetle within the planning area is less than 100 acres based on 2013 US Forest Service damage assessment flights (USDA Forest Service, Forest Health Protection and its partners, 2014).

Within ponderosa pine woodlands in the planning area (Southern Rocky Mountain Ponderosa Pine Woodland), there are five defined succession classes, A through E, with the addition of Uncharacteristic Exotic Vegetation, and Uncharacteristic Native Vegetation Cover/Structure/Composition categories. These S classes are summarized in Table 3.4.4, below.

Table 3.4.4 Ponderosa Pine Woodland Current and Historic Succession Class Distribution and Description			
Succession Class and Description	***Current Acres***	***Current %***	***Historic %***
Succession Class A *"Openings with grass, shrub and forbs created after replacement fire. May have seedlings of ponderosa pine or other species (eg, Douglas-fir/white fir)."*	546.42	2.99%	10%
Succession Class B *"Forest canopy closure is 35% or greater. Closed pole-sapling/grass and shrubs. Shrub cover can be dense."*	6,458.29	35.31%	9%
Succession Class C *"Forest canopy closure is 15-35%. Open pole-sapling/grass and shrubs."*	5,259.59	28.76%	20%
Succession Class D *"Forest canopy closure is 15-35%. Open large trees/grass and shrubs. Ponderosa eventually outnumbers Douglas fir/white fir due to insect/disease and difference in fire resistance."*	3,791.80	20.73%	60%
Succession Class E *"Forest canopy closure is 35% or greater. Closed large, trees, poles, saplings and shrubs."*	1,460.45	7.99%	1%
Uncharacteristic Exotic Vegetation *Sites where environmental site data as well as historical data indicate that ponderosa pine woodland was the dominant vegetation type, but are now supporting exotic vegetation, such as invasive or noxious weeds.*	114.98	0.63%	N/A
Uncharacteristic Native Vegetation Cover / Structure / Composition *Sites in which disturbances have occurred outside of the historic range of variability, resulting in stand structures which are uncharacteristic of historical values.*	657.39	3.59%	N/A
Succession Class Descriptions in quotations from LANDFIRE, 2007			

A schematic of the ponderosa pine vegetation dynamic model is below, in Figure 3.4.3.

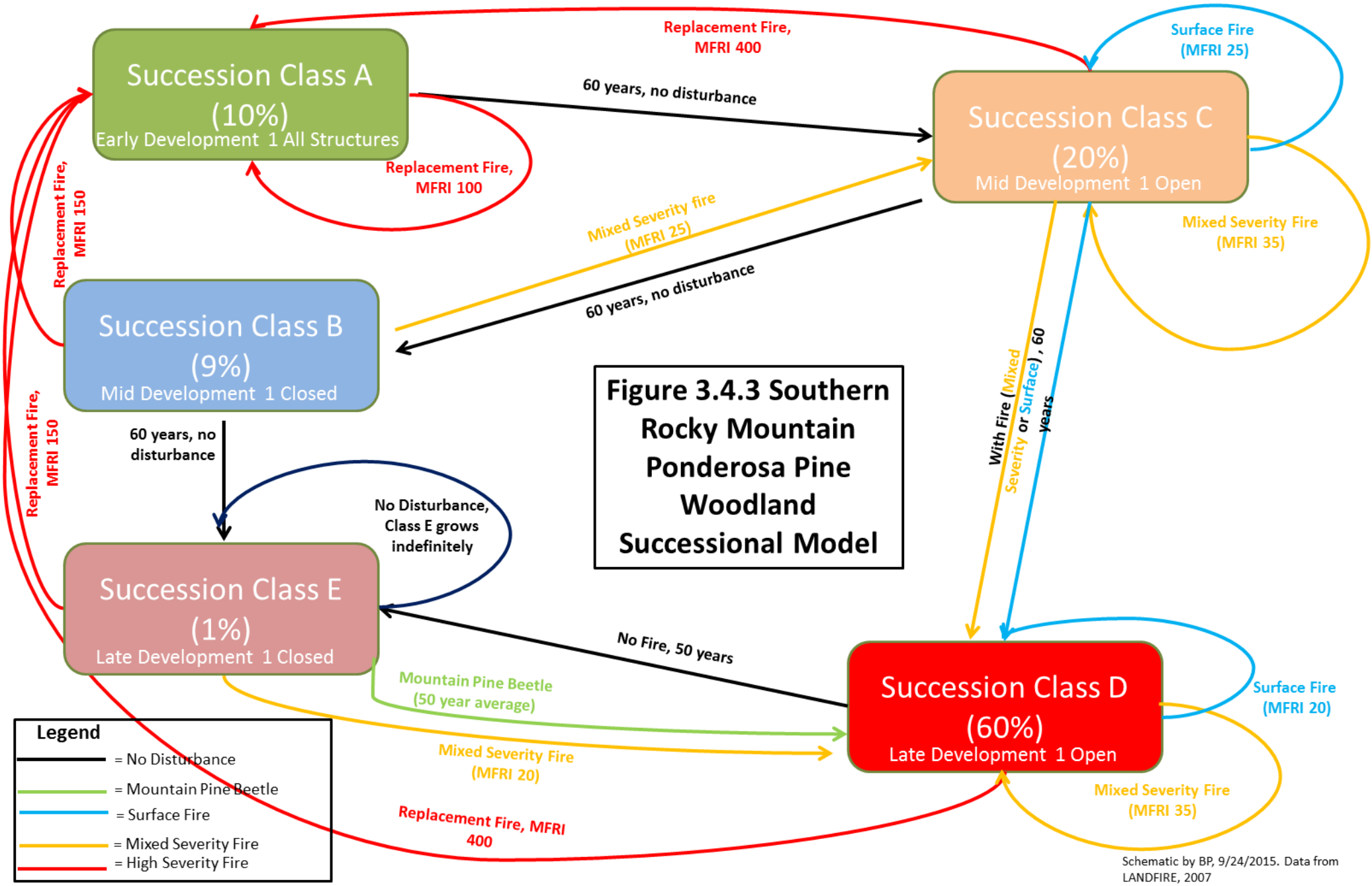


Figure 3.4.3 Southern Rocky Mountain Ponderosa Pine Woodland Successional Model

The S class distribution across the planning area supports the argument that fire exclusion is primarily responsible for pine stands S classes within the planning area being outside of the historic range of variability. Currently, few acres are within S class A, where openings have been created by fire which support seedlings. Additionally, far too few acres are within S Class D, characteristic of stands where fire has burned repeatedly, and large trees are spaced apart with a healthy understory (20.73% vs. 60% historic value).

The remaining S classes, B, C, and E, are overrepresented within the planning area. S class B, mid-development closed, is the most common S class on the landscape. These stands are relics of the heavy logging activity that the area experienced from the 1930's to the late 1960's. Fire exclusion favors S classes B, C, and E, since any entry of fire to these stands would change them to either A, D, or in some cases maintain them within C.

As mentioned before, the past twenty years have seen 1,805 acres of ponderosa pine woodland be burned in wildfires. In addition, 1,528 acres have had prescribed fire applied to them, as well as 3,065 acres of mechanical treatment. While these numbers equal approximately one third of all ponderosa pine in the planning area, many stands were treated mechanically before prescribed fire. A more realistic estimate is that 4,000 acres of ponderosa pine have been treated either mechanically, or with prescribed fire, or with both, in the past twenty years. This represents approximately 21% of the ponderosa pine. Within the twenty year timeframe, under presumed historic conditions, between 36,000 and 60,960 acres would have burned, due to multiple fires burning the same area during the reference timeframe.

3.4.1.3 Spruce-Fir Forest and Woodland

Fire history in Spruce-Fir forests and woodlands within the planning area is extremely limited, with a handful of starts burning 8 acres in the past twenty years. However, the adjacent San Juan National Forest and Rio Grande National Forest have experienced multiple fires which have burned this vegetation type, including the 2013 West Fork Complex, burning in excess of 100,000 acres.

Historically, fire and insect epidemics were the disturbance agents in this forest type. Fires were able to burn very few years every century due to the cold and wet sites where this forest type occurs. During the years when conditions allowed fire spread, extensive burning occurred at replacement severity (>75% overstory mortality), as indicated by patches of forest undergoing succession at the same rate (Romme, et al, 2009). This forest type is classified as Fire Regime V, with a return interval of over 200 years, and replacement severity.

Fire return intervals within this vegetation type are in excess of 200 years, and stands in excess of 600 years without fire have been documented adjacent to the planning area. While FRCCmt identifies the vast majority of spruce-fir stands as having moderately departed fire regimes from the historic range of variability, in reality the stands are mostly FRCC 1. This is due to the very long timeframe of fire return intervals within this forest type. It very common for spruce-fir forests to go without fire for 20 years, as far as reliable fire history data is available.

Just as important as fire as a disturbance agent, and more common in the planning area currently, is insect epidemic. The spruce bark beetle (*Dendroctonus rufipennis*) is endemic to spruce-fir

stands throughout their range, and is usually at low levels which do not impact entire stands. However, in the past twenty years, 1,783 acres of Spruce-Fir forest (10.5%) experienced spruce beetle mortality (USDA Forest Service, Forest Health Protection and its partners, 2014). This is a much lower level of epidemic that areas surrounding the planning area (Gunnison Field Office BLM, Rio Grande National Forest, and San Juan National Forest).

While concern has been raised about the potential for increased fire activity in beetle killed spruce stands, recent research from 2012-2013 Southwest Colorado wildfires within spruce-fir has found that there beetle infestation does not alter fire severity. Instead, topography, basal area, and fire weather are much more important contributors to final fire severity (Andrus, et. al, 2015). While these fires did exhibit extreme fire behavior and burned large areas at high severity, they also occurred during a prolonged drought period on extreme slopes, with most of the acreage burned in critical fire weather conditions.

The limited extent of spruce-fir within the planning area combined with the long fire return interval has led to nearly all of it being classified as late development, either open or closed canopy. This is not necessarily outside of the historical range of variability, as fires within this vegetation type could commonly exceed the area within the planning area (16,945 acres). There is not enough of this vegetation type to validate S class departure within the planning area, but it can be inferred that due to the lack of human disturbance, an unaltered fire regime, and a low-level insect epidemic, that the spruce-fir forests and woodlands within the planning area are likely close to their historic S class distribution. While the ongoing beetle epidemic will likely impact more acres of spruce-fir, the present scale of beetle infestation seems not far outside of the historic disturbance regime within the planning area.

3.4.2 Shrublands

3.4.2.1 Sagebrush Shrubland and Steppe

Depending on elevation and climate, sagebrush shrubland and steppe within the planning area falls into two distinct types with very different fire regimes. Valley bottoms and areas with deep soils, as well as many upland sagebrush shrubland sites would have historically experienced replacement fire every 40-80 years (Fire Regime IV). In areas of alkaline soils, black sagebrush dominates, and due to lower site productivity, is classified as Fire Regime V, with a return interval in excess of 200 years.

In the past twenty years, 2,747 acres of sagebrush shrubland and steppe have burned in wildfires. 1,198 acres have been burned in prescribed fires, and 5,009 acres have been treated mechanically. Combined this represents 8,954 acres of sagebrush disturbance, or 8% of the area occupied by sagebrush.

Table 3.4.5 Fire Regime Condition Class of Sagebrush Shrubland and Steppe

Fire Regime Condition Class	Total Acres	% of Acres
FRCC 1	33,093.64	29.56%
FRCC 2	67,151.57	59.98%
FRCC 3	11,696.98	10.46%
Total	**111,942.18**	**100.00%**

The majority of sagebrush within the planning area is classified as FRCC 2, where fire regimes are moderately altered from historic ranges (Table 3.4.5). As mentioned in Chapter 3.3.2.1, the most likely explanation of this is the conversion of large areas of sagebrush to agricultural land in the early part of the 20th century. Landscape fragmentation led to less fuel continuity, and combined with fire exclusion created a situation in which less sagebrush shrubland and steppe burned than historically would have. With fire exclusion, mountain shrubland species and pinyon/juniper woodlands expanded across a greater area than the HRV into former sagebrush areas. Relatively more frequent fires within mountain big sagebrush communities compared to mountain shrublands or pinyon/juniper woodlands would have kept this expansion in check to a greater extent than current conditions.

While these two types of sagebrush sites can occur right next to each other, they are extremely different in terms of response to fire and disturbance. Mountain big sagebrush can transition from a recently burned state to one where sagebrush exceeds 26-45% cover of 1-3' shrubs within 50 years, while in low sagebrush communities over 120 years is needed to go through a similar successional process, which results a much lower sagebrush cover with much smaller individual plant size.

3.4.2.2 Mountain Shrubland

Mountain shrublands are highly fire adapted. Most species present within this vegetation type have extensive root systems capable of resprouting after disturbance. In addition, larger Gambel oak has relatively thick bark which allows many larger stems to survive fire which does not kill the crown of the shrub.

Fire history within the planning area in mountain shrubland is relatively robust thanks to the 2012 Weber fire, where 3,354 acres were burned. Additionally, another 1,117 acres of this vegetation type have had either prescribed fire or mechanical treatments applied in the past twenty years. This amounts to 31% of this vegetation type having some form of disturbance applied in the past twenty years.

The best fire history information comes from Mesa Verde National Park, where fire return intervals were determined to be about 100 years within mountain shrublands (Floyd, et. al, 2000). Multiple large fires in both the latter half of the 19th century, as well as numerous other fires in the second half of the 20th century and early part of the 21st century, burned roughly the same cumulative area. Because fire suppression policies were not yet in place during the 19th century, mountain shrubland fire regimes adjacent to the planning area appear to be within the HRV. Similar to pinyon-juniper fires, mountain shrubland fires can exhibit extreme fire behavior when weather conditions align, and even the most aggressive firefighting effort cannot control them until conditions abate. While replacement fire is common in mountain shrublands, mixed severity fire is just as prevalent, especially when the vegetation type is interspersed with others, as is common within the planning area.

Table 3.4.6 Fire Regime Condition Class of Mountain Shrubland

Fire Regime Condition Class	Total Acres	% of Acres
FRCC 1	8,884.96	61.89%
FRCC 2	3,482.90	24.26%

FRCC 3	1,988.64	13.85%
Total	**14,356.49**	**100.00%**

Because of the amount of disturbance experienced across the range of this vegetation type throughout the planning area, most of it is classified as FRCC 1 (Table 3.4.6). Due to the relatively limited extent of this vegetation type, the S Class distribution can only be approximated, but it is likely within the HRV.

3.4.3 Grasslands

Within the planning area, pure grasslands only occur at the very lowest elevations, such as the southwestern 1/3rd of CANM and the valley bottom of Disappointment and Big Gypsum Valleys. These areas account for the vast majority of this vegetation type, but in disturbed areas grassland can occur as the first S Class of many forested and shrubland vegetation types.

In upper elevation areas, grasslands occur as small openings within either shrubland or forested communities, and typically will experience fire only if it is imported from adjacent communities. Therefore, historic fire return intervals for adjacent communities are likely representative of these grasslands (eg. 6-10 years for meadows within ponderosa pine sites, and upwards of 200 years for grasslands adjacent to spruce-fir sites).

With the introduction of livestock grazing on grassland vegetation types within the planning area, disturbance history is very difficult to determine. These systems likely experienced relatively frequent fire return intervals (37-75 years) at replacement and mixed severities (LANDFIRE, 2007). However, due to the small scale of these systems throughout the planning area fire history cannot be definitively ascertained.

Introduced grasslands by their very nature do not have a historic disturbance regime within the planning area. While some areas of this vegetation type have burned in the past twenty years, fire cannot be said to be a critical natural process in them.

3.5 Wildlife

3.5.1 Threatened and Endangered Wildlife Species

3.5.1.1 Gunnison Sage-grouse (*Centrocercus minimus*)

Gunnison Sage-grouse (Sage-grouse) were listed as threatened in November of 2014. At the time of listing occupied and unoccupied critical habitat was designated throughout their range (see below section: Gunnison Sage-grouse critical habitat). Sage-grouse currently occur in seven widely scattered and isolated populations in Colorado and Utah. Two of the seven populations occur, in part, within the proposed action area: the San Miguel and Monticello/Dove Creek Populations.

Gunnison Sage-grouse are sagebrush obligates that rely on sage-steppe habitats throughout the year. Sage-brush is particularly important because in the winter Sage-grouse rely 100 percent on sagebrush as a food source to sustain them through the winter. The rest of the year Sage-grouse rely on a greater complexity of sagebrush ecosystems. For example, in the spring and summer,

Sage-grouse rely on insects and forbs as well as sagebrush for their diet. Additionally, Sage-grouse rely on sagebrush and the intermixed grasses for cover during breeding and for camouflage from predators.

Typically, Sage-grouse habitat is broken into three semi-seasonal parts: breeding, summer-late fall and winter. These habitats are described by the Rangewide Steering Committee as:

- **Breeding** habitats are those habitats that are within 4 miles of an active strutting ground or lek. These habitats include active strutting grounds, nesting areas and early-brood rearing habitat, and area typically occupied March – late June.
- **Summer-late fall** habitats vegetation communities consist of sagebrush, agricultural fields, and wet meadows that are within 4 miles of an active strutting ground.
- **Winter** habitats are described as sagebrush areas that are within currently occupied habitat that are not covered by snow in average winters. These areas have sufficient sage and shrub height to be above average snow depths.

Two populations of Sage-grouse occupy habitats within the planning area: the Monticello-Dove Creek population, which occupies areas west and north of the town of Dove Creek, Colorado, and east of Monticello, Utah, and the San Miguel population, which occupies Dry Creek Basin, Hamilton Mesa, Miramonte Reservoir, Gurley Reservoir, Beaver Mesa and Iron Spring in San Miguel and Montrose counties, Colorado.

Dove Creek Population

Of the Monticello-Dove Creek population, only the Dove Creek portion occurs within the planning area and is geographically separated from the Monticello sub-population; although, some gene flow between the subpopulations is thought to occur (CPW 2011). The Dove Creek subpopulation is further separated into two separate occupied areas, West and North (referencing their proximity to Dove Creek). Both areas within the Dove Creek population have seen declines in the number of Sage-grouse recently. No males were counted in 2015 on all leks in the north area and one male was counted on all leks in the West area (compared to 2012 when three males were seen at all leks in the northern area and 6 males were seen on all leks in the western area). Dove Creek consists of 10 leks in the two areas. In the last 4 springs only two leks have been active.

Management within Dove Creek population boundaries include fuels reduction and habitat improvement projects such as prescribed fire and mechanical mastication. Currently, there are no active grazing allotments within Sage-grouse habitat, but oil and gas has been active in areas surrounding Dove Creek including a recent 3D seismic exploration project that covered many areas North of Dove Creek. Fuels reduction projects have focused largely on removing ponderosa pine understory and mastication and prescribed fire of pinyon-juniper and gamble oak.

A major threat to the Dove Creek Sage-grouse population is the loss of habitat due to the conversion of private lands to agriculture. The remaining habitat in Dove creek is either heavily fragmented (generally the west sub-population) or peripheral due to conversion of historic

central habitats (generally the north sub-population). Areas that have been fragmented don't contain a large amount of BLM and are primarily Sage-brush, a vegetation class not targeted for this analysis. The peripheral habitats contain a mix of sage-brush, shrubs (e.g. oak and mountain mahogany), pinyon-juniper and ponderosa pine. Unlike pinyon-juniper and ponderosa pine, Sage-grouse tolerate the shrub components of these habitats reasonably well. However, when shrubs become too dense habitats become uninhabitable. At what point this occurs is not currently known. In the past, managers have mechanically masticated oak in an attempt to open up sagebrush areas and slow encroachment. These treatments have largely been unsuccessful due to oaks ability to vigorously resprout. Oak encroachment is still a degrading factor within the northern areas of Dove Creek.

The Dove creek west population was augmented three times in the Fall of 2011 and the spring and fall of 2011 totaling 42 birds (Table 3.5.1.1)

Table 3.5.1.1 Age/sex of and status (as of November 29, 2011) of Gunnison sage-grouse released in the Dove Creek population area.

Release period and status	Fall 2010	Spring 2011	Fall 2011
Age/Sex			
Male Adult	2	3	0
Fem Adult	1	3	1
M (Unk Age)	4	0	0
M Juv	5	2	1
F Juvenile	1	5	1
F (Unk Age)	0	1	1
Unk Sex Juvenile	2	0	8
Unk Sex /Unk Age	0	0	1
Totals	15	14	13

* "Mortality/slipped" refers to known mortalities or collars that were found separate from any evidence of mortality. "Lost" means not located in last 6 months or since release; "Expired" refers to 2 chick collars that were expected to stop transmitting—fate of these 2 birds is unknown.

Several forms of habitat improvement have occurred in the Dove Creek to improve habitat for Sage-grouse. Most recently mastication of oak has occurred in the northern population areas and replanting sagebrush in agricultural fields has occurred on private lands adjacent to the BLM.

San Miguel Population

The San Miguel population consists of: Dry Creek Basin, Hamilton Mesa, Miramonte Reservoir, Gurley Reservoir, Beaver Mesa and Iron Spring subpopulations. Only the Dry Creek Basin Portion of the subpopulation occurs within the planning area. Dry Creek Basin has been heavily augmented with transplanted birds from the Gunnison Basin population over the last 7 years. In total, 89 birds have been moved to Dry Creek Basin since 2007. Lek count numbers increased in 2015 after seeing 3 years of decline. Five males were seen lekking this year, one last year, 2 in

2013 and 3 in 2012. Zero males were counted on leks the two years previous, 2010 and 2011. Four leks exist within Dry Creek Basin subpopulation: New Desert, Desert, Triangle, and Nelson Creek. In the last 4 years only one lek has been active.

Historic grazing practices and management, and drought appear to have contributed to the depletion of the understory of vegetation in some parts of Dry Creek Basin. In recent years, livestock grazing has been altered to specifically address Sage-grouse habitat needs. Oil and gas, hardrock mining (flagstone), powerlines and roads also contribute to Sage-grouse habitat degradation and disturbance within the basin.

Vegetation monitoring specific to Sage-grouse has been conducted since 2007 within the basin. Anecdotally, historically grazed areas have good grass coverage, but grass heights do not meet RCP guidelines set for Sage-grouse habitat. In areas rested for grazing, grass meets height recommendations but do not meet cover requirements. Forbs, in general, do not meet RCP guidelines for Gunnison Sage-grouse for cover but are of adequate height basin wide. Sagebrush within the basin are adequate for height. Some areas within the basin have adequate sagebrush cover, while others do not or are absent of sagebrush. However, a mosaic of sagebrush cover is typical of Sage-grouse habitats. Rangeland monitoring in the basin show a trend towards improving habitat conditions.

Since 2001, the BLM in conjunction with CPW, have conducted landscape scale habitat improvements within Dry Creek Basin. In northwestern portions of the basin 1,700 acres of pinyon-juniper have been removed in the East Monogram Mesa area, in the southeastern portion of the basin 1,200 acres of pinyon-juniper have been masticated in the Dry Wild area, and several small seedings and sagebrush thinning targeted at improving Sage-grouse habitat have been conducted central in the basin in the Six-Shooter pasture. Additionally, in 2015, 288 acres of pinyon-juniper were masticated in the northwestern portion of the West Highway pasture (center of the basin).

Several studies have demonstrated noises negative effects on Sage-grouse lek attendance (Blickely et al., 2012;, Piquette et al., 2014). It also appears that intermittent noise has a greater effect than constant noise (Blicklely et al., 2012) and that noise within two miles of Sage-grouse leks has a greater effect than noise produced further away (Piquette et al., 2014). However, little demonstratable evidence exists that shows the effects of noise on Sage-grouse during non-reproductive periods. One study showed that road densities (often associated with intermittent noise disturbance) did not alter Sage-grouse overall use (Aldridge et al., 2008). Although Aldridge's paper did not take into account the traffic intensity levels during his study, his research gives insight into Sage-grouse persistence when minor disturbance is present. Additionally, only changes in Sage-grouse use during periods when noise is present have been documented (Blickely et al., 2012) and it has been observed that once noises subside use returns to normal levels. Also, noise during non-breeding periods is thought (hence the focus of research on lek attendance) to have less of an effect on Sage-grouse.

All of the habitat within Tres Rios Field Office is designated occupied critical habitat for the San Miguel population and therefore not included in the proposed action for treatment. However,

access to several areas that are included in the proposed action can only be accessed through these occupied areas.

3.5.1.2 Gunnison Sage-grouse Critical Habitat

In November of 2014 the Fish and Wildlife service designated critical habitat for Gunnison Sage-grouse. Critical habitat is described as

> "specific areas within the geographical area occupied by a species, at the time it is listed in accordance with the [Endangered Species] Act, on which are found those physical or biological features essential to the conservation of the species and that may require special management considerations or protection, and specific areas outside the geographical area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species."

The Act further states that "adverse modification of critical habitat by any activity funded, authorized, or carried out by any federal agency" is prohibited.

Critical habitat was broken down into two categories: occupied and unoccupied. Across their range, 1.4 million acres of critical habitat has been designated. Within the Tres Rios field office 256,006 acres of critical habitat occurs (56,030 acres in Dove Creek and 54,977 acres in Dry Creek) of which 94,946 acres is occupied and 160,061 acres is unoccupied (Dove Creek: 39,969 acres occupied, and 160,061 acres unoccupied; Dry Creek Basin: 54,977 acres occupied).

	Table 3.5.1.2. Acres of occupied and unoccupied critical habitat within the planning area.			
Population	**Occupied (Acres)**	**Unoccupied (Acres)**	**Vacant (Acres)**	**Total (Acres)**
Dove Creek	5,227	34,153	0	39,380
San Miguel	34,988	0	0	34,988
Total	40,215	34,153	0	74,368

Of areas within Sage-grouse critical habitat, only those areas that meet at least one of the primary constituent elements are considered critical habitat. These habitats consist of Sagebrush dominated plant communities of sufficient size and configuration to encompass seasonal habits of Sage-grouse including breeding, summer and winter habitat and alternative habitats such as wet meadows, riparian shrub areas and agricultural fields.

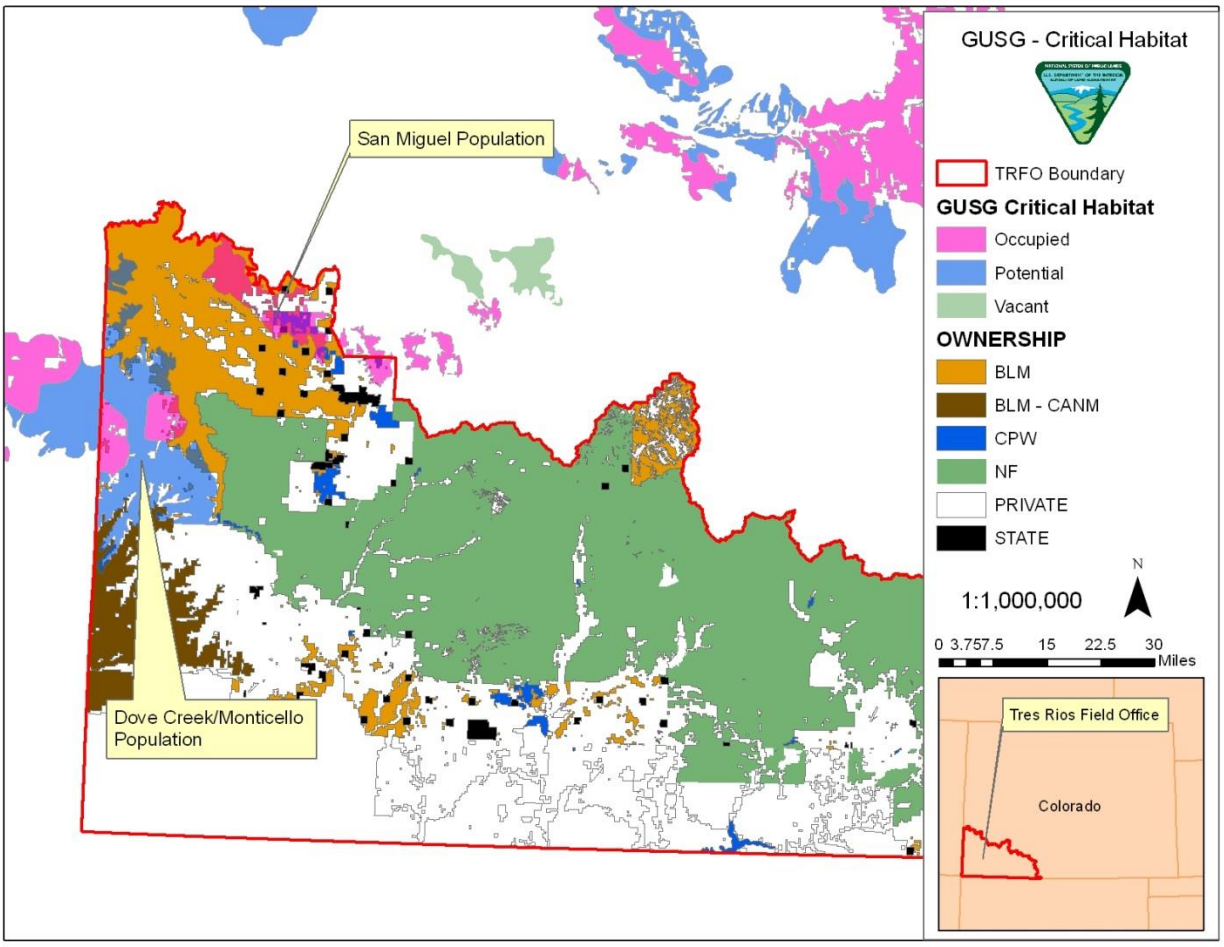


Figure 3.5.1.2. Gunnison Sage-grouse Critical Habitat within the planning area. Dove Creek /Monticello and San Miguel populations are both identified.

3.5.1.3 Mexican Spotted Owl (*Strix occidentalis lucida*)

The Mexican spotted owl (MSO) was listed as threatened in 1993. No critical habitat is designated for MSO within the planning area, however potential habitat exists in several areas. Mexican spotted owls have been observed to nest, roost, forage, and disperse among a wide array of biotic communities, the owl is typically considered a "habitat specialist" in that roost and nest habitats generally occur in late seral forests or rocky canyon habitats. Specifics regarding primary habitat variables for MSO habitat can be found in the Recovery Plan in Appendix C (FWS, 2012).

Habitat on the TRFO, and within the planning area, includes the Dolores River Canyon, Slick Rock Canyon, Summit Canyon, Coyote Wash, McIntyre Canyon and Bull Canyon. Across the

planning area, habitat for MSO is estimated at 91 miles of canyon cover 48,178 acres. Surveys have been conducted on the TRFO for MSO since the early 1990s. Surveys of habitat have not identified any occupied sites or detected any individuals. However, MSO have been found in similar habitat in Utah. Mesa Verde National Park has had nesting MSO until as late as 1998. The last visual detection was a juvenile male in 2005 and the last audio detection was in 2006 in Mesa Verde.

3.5.1.4 Other Threatened and Endangered Species Not Carried Forward for Analysis.

Canada lynx (*Lynx Canadensis)*, New Mexico meadow jumping mouse (*Zapus hudsonius luteus)*, southwestern willow flycatcher (*Empidonax tarilii extimus)*, yellow-billed cuckcoo (*Coccyzus americanus)*, boneytail chub (*Gilia elegans)* , Colorado pikeminnow (*Ptychocheilus lucius*), and greenback cutthroat trout (*Oncorhynchus clarki stomias)* were all considered for analysis under the proposed action. Because either they don't occur within the proposed action area or they are protected through design criteria, this project will have "no effect" on these species or their habitat, and they, therefore, will not be carried forward for analysis.

3.5.2 Migratory Birds

Numerous species occur within the planning area that are protected under the Migratory Bird Treaty Act (MBTA). A complete list of species that may occur within the project area can be found at (http://www.blm.gov/style/medialib/blm/wo/Information_Resources_Management/policy/im_attachments/2008.Par.46239.File.dat/IM2008-050_att2.pdf). Continental and local declines in numerous bird populations have led to concern for the future of migratory and resident bird species. The reasons for declines are complex. Breeding habitat loss, modification and fragmentation, loss of wintering and migratory stopover habitat, brood parasitism, and pesticide use have been implicated. Of primary concern to this analysis is: alteration of habitat either beneficial or negative.

The proposed action occurs in areas that, due to fire suppression over the last century, drought and changes in climate, are largely removed from their historic successional states. The habitats that this proposed action will address and analyze are limited to: Pinyon-Juniper Woodland, Ponderosa Pine Woodland, or Spruce-Fir Forest and Woodland (for a complete list of habitat types within the TRFO see Table 3.3.2). These three vegetation categories offer important habitat that migratory birds rely on for a variety of aspects of their life history. Nesting habitat, food, prey, cover, courtship areas, roosting areas and stands, and migratory corridors are just a few of the important life history needs that habitat targeted under the proposed action provide to migratory birds.

Birds of conservation concern are migratory birds that are low in numbers, declining in numbers or have been recently delisted as threatened or endangered. Within the planning area the following species may occur: Brewer's sparrow, burrowing owl, Cassin's finch, flammulated owl, Grace's warbler, gray vireo, juniper-titmouse, Lewis's woodpecker, loggerhead shrike, olive-sided woodpecker, peregrine falcon, pinyon jay, prairie falcon and sage thrasher. These will largely benefit from the proposed action. They are all native to this area and have evolved in the ecosystems that are covered under this analysis. As such, they are accustomed to wildfire

and its effects on the landscape. The return of many of the ecosystems that occur within the planning area to a more natural fire regime will largely improve habitat for these species. As a result, Migratory Birds as a group will not be carried forward for analysis, with the exception of raptors due to their sensitivity to disturbance and due to their group showing a high site fidelity (tendency to return to the same site or group of sites year after year).

Species of concern for this analysis are northern goshawk, Cooper's hawk, sharp shinned hawk, burrowing owl, great horned owl and red-tailed hawk (bald and golden eagle will be addressed below). We have not identified all important nest sites within the planning area, but historic surveys have shown that nest sites are numerous for all of these species, with the highest densities being red-tailed hawk, Cooper's hawk. The most important habitat for nesting raptors under the scope of this analysis is ponderosa pine. However, pinyon-juniper is also regularly used by some raptor species.

3.5.3 Bald and Golden Eagle

3.5.3.1 Bald Eagle

Bald Eagles have an extremely large range and today are common across the United States. In 1973 the entire population was listed under the ESA due to low numbers caused by over hunting and poor reproductive success as a result of pesticide use over middle of the 20th century. The bald eagle was delisted in 2007, but still maintains protection under the Bald and Golden Eagle protection act. Current populations are thought to be over 300,000 individuals.

Within the planning area bald eagles nest in many areas with water nearby and roost in several locations in Disappointment Valley, Big Gypsum Valley, Dry Creek Basin, areas surrounding Cortez and areas in and around Canyons of the Ancients National Monument.
During the breeding season, Bald Eagles typically nest in ponderosa pine, spruce, fir, or cottonwoods or any other large tree near water. Typically, bald eagles are not found during the breeding season in pinyon-juniper habitats, the dominant fuel type in this analysis.

3.5.3.2 Golden Eagle

Golden Eagles are common within the planning area in open and semi-open habitats. Nests within the Tres Rios Field Office can be found at all eleveations and are located on the canyon walls near open areas. Most frequently, golden eagles occupy desert areas where sandstone cliffs and outcrops are abundant. These cliff habitats are most often associated with sage/shrub-steppe and pinyon-juniper. Golden eagles regularly use alternative nests, but return turn to the same territory (group of nests) year after year. Often when an eagle dies, another eagle will take over the vacated territory.

Fourteen golden eagle nests were occupied within the planning area in 2014. Historically, 76 nests have been found within the planning area, although some were alternate nests and have never been occupied. Occupied territories area fairly evenly distributed throughout the planning area. However, several nests are located in Big Gypsum Valley, and in Canyons of the Ancients National Monument (not included but adjacent to the analysis area).

3.5.3.3 Bald and Golden Eagle Winter Roost

In the winter, bald and golden eagles often occupy roost sites during the night within the planning area. Extensive surveys have been conducted over the last 20 years at several known nest locations. Roost numbers have seen sharp declines over the last decade. The exact cause of roost site occupancy is not known. However, development of roads and oil and gas infrastructure combined with increased traffic are thought to at least have contributed to decreases. Roost sites are located in many locations in lower elevations throughout the planning area. They are most commonly associated with cottonwood galleries in shrub ecosystem drainages but can also be found in large single live or standing dead or partially dead ponderosa pine. Nine roost sites are known within the planning area.

3.5.4 Sensitive Species

The BLM 6840 manual as an objective states that sensitive species shall be protected by "proactive conservation measures that reduce or eliminate threats to Bureau sensitive species to minimize the likelihood of and need for listing of these species under ESA". Allowing natural fire to burn that will meet ecological resource objectives will contribute to the return of habitats to more historic conditions and improve conditions for BLM sensitive species. Although, some individuals, or small portions of habitat, will be impacted by the proposed action, and the proposed action may temporarily reduce the number of individuals or habitats within the 1.000 acre area burned in a year, sensitive species will, as a whole, occur in enough numbers and in enough areas that temporary loss of habitat will not negatively impact their populations. Sensitive species, because of the beneficial effects of the proposed action and relatively small size of impact, will not be carried forward for further analysis within this document.

3.6 Cultural Resources

The current archaeological record in the planning area indicates least 10,500 years of human presence. Prehistoric and historic traditions within the area are generally categorized and discussed in terms of periods or eras that represent trends of tradition evident in the material record. In southwest Colorado, Paleoindian, Archaic, Formative, Protohistoric and Historic periods/eras are present.

Cultural resources within the analysis area include a diverse array of prehistoric, protohistoric, and historic sites. Common Prehistoric and Protohistoric site types include open artifact scatters and open camps. Prehistoric sites types also include habitation sites, such as Ancestral Puebloan open and sheltered architectural sites, and rock art panels. Historic site types commonly include homesteads, ranching infrastructure, mining and milling complexes, prospecting sites, and historic roads and trails.

A total of 1,316 cultural resource inventories have been conducted in the 675,804 acre analysis/planning area, resulting in approximately 156,044 acres of survey. Some of these surveys overlap each other, so the actual acreage and percentage of the area that has been inventoried (136,139 ac. (20%)) is less than the previously conducted survey would initially seem to indicate. A total of 8,768 archaeological sites have been recorded within the analysis

area. Approximately 6,646 of these sites (76%) are listed on or are eligible for inclusion on the National Register of Historic Places.

A total of 479 archaeological inventories have been conducted in the 304,450 acre area proposed for allowing naturally ignited fires to be managed to meet resource benefit, resulting in approximately 45,105 acres of survey. Some of these surveys overlap each other, so the actual acreage and percentage of the - area that has been inventoried (40,450 ac. (13%)) is less than the previously conducted survey would initially seem to indicate. A total of 1,428 archaeological sites have been recorded in the 304,450 acre area, with 676 of these sites (47%) listed on or are eligible for inclusion on the National Register of Historic Places (NRHP). Site density varies throughout the planning area.

3.7 Native American Religious Concerns

Tribal consultation for the Proposed Action was initiated on August 5, 2015 with the 26 tribes with which the Tres Rios Field Office consults. The Tribes have been asked to provide additional information regarding properties of religious and cultural significance that could be affected by the proposed action.

Responses were received from the Pueblos of Santa Clara, San Felipe and Ysleta del Sur, and the Hope Tribe, all of which have cultural affiliations with sites in the analysis area. Two of the tribes (Hopi and San Felipe) provided information regarding properties of religious and cultural significance of importance or concern to them. The Hopi Tribe stated that they consider prehistoric archaeological sites of their ancestors to be "footprints" and Traditional Cultural Properties. The Hopi requested information on all known archaeological sites within the analysis area to determine which sites may be significant to the Hopi. San Felipe stated there were areas of cultural concern to the Pueblo of San Felipe within the Tres Rios Field Office. While tribal consultation is still in progress, no new properties of religious or cultural significance have been identified by the tribes to date.

3.8 Noxious and Invasive (non-native) Weed Species

Noxious non-native invasive weed species populations known to occur across the Tres Rios Field Office include the following:

Table (3.8.1): Noxious weed species known to occur in Tres Rios Field Office.

Common Name	Scientific Name	State of Colorado Classification
Canada thistle	*Cirsium arvense*	Class B
Musk thistle	*Carduus nutans*	Class B
Scotch thistle	*Onopordum acanthium*	Class B
Dalmatian toadflax	*Linaria dalmatica*	Class B
Yellow toadflax	*Linaria vulgaris*	Class B
Houndstongue	*Cynoglossum officinale*	Class B
Oxeye daisy	*Chrysanthemum leucanthemum*	Class B
Russian knapweed	*Acroptilon repens*	Class B
Spotted knapweed	*Centaurea stoebe*	Class B
Russian olive	*Elaeagnus angustifolia*	Class B

Salt cedar	*Tamarix chinensis*	Class B
Hoary cress	*Cardaria draba*	Class B
Common mullein	*Verbascum Thapsus*	Class C
Cheatgrass	*Bromus tectorum*	Class C
Halogeton	*Halogeton glomeratus*	Class C

The State of Colorado classifies noxious weed species as either class A, B or C for management purposes. Class A species are those noxious weeds designated by the State for eradication. Class B species are those that must be controlled to stop the continued spread and Class C species that the State will additional education, research, and biological control resources to those jurisdictions within the State that choose to require management of these species.

Known infestations of noxious weeds are primarily associated with disturbed sites such as along roads, pipelines, power lines, recreational trails, oil and gas well pads, stock reservoirs, fence lines, mining activities and wildfires.

As part of the Tres Rios Field Office noxious weed management program known populations of Class B species are treated annually with herbicides and/or biological control to reduce the spread of these species. These treatments are conducted in cooperation with the local County noxious weed programs, oil and gas operators, and other collaborative partnerships across the field office. Class C species such as cheatgrass and halogeton are not treated annually across the field office, but are treated where identified as an issue in connection with specific vegetation manipulation projects.

Noxious weed treatment and/or inventory activities are mapped using GIS mapping software. Treatment effectiveness of noxious weeds is determined based on comparing the increase or decrease of population densities mapped following treatment activities.

Because design criteria has been developed as part of the proposed action for post fire monitoring and treating of potential infestations of noxious weed species resulting from fire, noxious weeds will not be carried forward for analysis.

3.9 Wild Horses

A small population of wild horses protected under the 1971 Wild Free-Roaming Horse and Burro Act are managed by the Tres Rios Field Office as part of the Spring Creek Basin Herd Management Area (HMA). The HMA is contained within the Spring Creek Basin within Disappointment Valley. The HMA is approximately 22,000 acres in size and the boundaries and wild horse movement is contained through a combination of existing fences and/or natural barriers such as cliffs or extremely steep terrain. Elevations within the HMA range from 6,200 – 7,400 feet. The dominant vegetation types consist of salt desert shrub plant communities occurring primarily on the valley floor and pinyon-juniper woodlands occurring in the higher elevations on steeper slopes.

The appropriate management level (AML) established for this HMA is currently a range of 35 – 65 adult horses. The Current number of wild horses within the HMA is 60 which are near the

upper level of acceptable numbers. Structural range improvements within the HMA consist of boundary fences, earthen stock reservoirs and water catchments with associated troughs.

In addition, the Spring Creek Basin HMA is becoming a popular destination by the public for viewing opportunities of wild horses in their natural environment.

3.10 Threatened, Endangered or Candidate Plant Species

Within the Tres Rios Field Office, there are several known occurrences of two federally listed as endangered plant species, one federally listed as threatened and one federally listed as a candidate species. The two endangered plant species include the Pagosa skyrocket (*Ipomopsis polyantha*) and the Knowlton cactus (*Pediocactus knowltonii*). Mesa Verde fishhook cactus (*Sclerocactus mesae-verdae*) is listed as threatened and the Schmoll's Milvetch (*Astragalus schmolliae*) is a candidate species.

However, based on the most current data from the Colorado Natural Heritage Program (CNHP) rare plants database (September 2013), there are no known populations of these endangered, threatened or candidate plant species present within the Tres Rios Field Office occur within the proposed action area and will not be carried forward for further analysis.

3.11 Sensitive Plant Species

Across the Tres Rios Field Office there are occurrences of eleven BLM special status plant species. The following table identifies the specific plant species and habitat.

Table (3.11.1). BLM Sensitive Plant Species.

Common Name	Scientific Name	Occurrence	Habitat
Jones' Bluestar	*Amsonia jonesii*	Known	Run-off fed draws on sandstone in pinyon-juniper, and desert shrub communities, 3,900' – 7000' elevation.
Naturita miklvetch	*Astragalus naturitensis*	Known	Sandstone mesas, ledges, crevices and slopes, 5,000' – 7,000' elevation.
Sandstone milkvetch	*Astragalus sesquiflorus*	Likely	Sandstone rock ledges, fissures of slickrock, talus under cliffs, and sometimes in sandy washes, 5,000' – 5,500' elevation.
Gypsum Valley cateye	*Cryptantha gypsophila*	Known	Scattered gypsum outcrops of the Paradox Member of the Hermosa Formation in Western Colorado.
Kachina fleabane	*Erigeron kachinensis*	Known	Saline soils in alcove and seeps in canyon walls, 4,800' – 5,600' elevation.
Comb Wash buckwheat	*Eriognum clavellatum*	Known	Shale soils in shadscale communities, 4,300' – 5,500' elevation. (known in 4 corners area and adjacent Utah)

Lone Mesa snakeweed	*Guiterrezia elegans*	Known	Grayish, argillaceous shale outcrops. Tends to be dominant plant in openings between low shrubs of *Artemisia*, *Chrysopsis*, and *Tetraneuris*.
Pagosa Springs bladderpod	*Physaria pruinosa*	Known	Mancos shale; ponderosa pine, Gambel oak; 6,800' – 8,000' elevation.
Dolores River skeleton plant	*Lygodesmia doloresensis*	Known	Reddish, purple, sandy alluvium and colluvium of the Cutler Formation between the canyon walls and the Dolores River juniper, shadscale, and sagebrush communities; 4,000' – 5,500' elevation.
Aromatic Indian breadroot	*Pediomelum aromaticum*	Known	Open pinyon-juniper woodlands, in sandy soils or adobe hills, 4,800' – 5,700' elevation.
Cushion bladderpod	*Physaria pulvinata*	Known	Grayish, argillaceous shale outcrops. Tends to be dominant plant in openings between low shrubs of *Artemisia*, *Chrysopsis*, and *Tetraneuris*.

Of the eleven identified BLM special status plant species occurring within the TRFO, only Naturita milkvetch (*Astragalus naturitensis*), Gypsum Valley cateye (*Cryptantha gypsophila*), Kachina fleabane (*Erigeron kachinensis*), Aromatic Indian breadroot (*Pediomelum aromaticum*) and Eastwood's monkey flower (*Mimulus eastwoodiae*) are known to occur within the proposed action emphasis area. Because these plant species are protected through design criteria, this project will have "no effect" on these species or their habitat, and they, therefore, will not be carried forward for analysis.

CHAPTER 4: ENVIRONMENTAL IMPACTS

4.1 Direct and Indirect Effects

Direct effects are caused by the action and occur at the same time and place. Indirect effects are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable.

4.2 Proposed Action

The proposed action would allow no more than 10,000 acres of fire to be used to meet RMP objectives within the fire emphasis area (Figure 2.1). Effects of the proposed action would occur within an area of 304,450.6 acres.

4.2.2 Soils and Water-Dependent Features

In the short term (1-10 years), the effects of the Proposed Action alternative carry a higher risk compared to the No Action Alternative that some watersheds would sustain impacts. This is because the larger the burn area, the more risk can increase that the fire may burn into important water-dependent ecosystems or features. Undesirable TRFO watershed effects include the burning of somewhat rare riparian areas (which are not fire-dependent ecosystems), burning over wetlands, springs, seeps and perennial streams, or accelerating erosion to the extent hillslope stability, aquatic ecosystems, and water quality are negatively affected. Again, most erosion occurs within a year of a burn (DeBano et al., 1998) and large contiguous areas of high severity burns have negative impacts to soils by definition (NWCG, 2015). It is also expected that the proposed action will provide many areas where there is a burn mosaic including a mix of unburned and low/moderate severity burned areas which have desirable ecosystem effects that would also benefit watershed condition.

In the long term (10 years to 50+ years), allowing fires within fire-dependent ecosystems under environmental and weather conditions favorable for a mosaic of burn severities should reduce risk of uncharacteristically large/severe fires and provide the lowest risk of catastrophic impacts to watersheds. Properly functioning fire-dependent ecosystems within historic range of variability have the best chance of sustaining fire in a manner that mimics the fire regimes the watersheds evolved with, and may help minimize the extent of watershed damage on a landscape-scale.

4.2.3 Vegetation

Vegetation within the proposed action area is categorized in Table 4.2.3.1, below.

Table 4.2.3.1 Vegetation Classification within Proposed Action

Vegetation Group	Total Acres	% of Acres
Forested	205,924.13	67.64%
Shrubland	67,600.04	22.20%
Grassland	17,398.12	5.71%
Sparsely Vegetated	13,528.31	4.44%

Grand Total	**304,450.60**	**100.00%**

Throughout all vegetation types, the proposed action would increase patch size and density compared to the no action alternative, limiting the potential spatial extent of future undesired fire effects, such as sedimentation, soil hydrophobicity, and invasive species introduction and spread.

4.2.3.1 Forested Lands

Within the proposed action area, there are 178,390 acres of Pinyon-Juniper woodland, and 14,773 acres of Ponderosa pine woodland. Spruce-fir is not found within the proposed action area; therefore there would be no effects to spruce-fir vegetation as a result of the proposed action.

Since forested lands make up the majority of the proposed action area, it is reasonable to assume that they would also make up the majority of the area burned under the proposed action.

Within Pinyon-Juniper woodland, the proposed action would allow for the re-introduction of longer duration fire events over more moderated weather conditions. Fire effects on vegetation would likely be more beneficial to forest health over a larger area than the no action alternative. While the overstory would be removed in some areas, this would allow for new growth of perennial grasses, forbs, and shrubs. In areas where pinyon-juniper is encroaching on sagebrush shrubland and steppe, the proposed action would reduce canopy cover and allow for re-expansion of sagebrush. Since surface disturbing activities would be less under the proposed action (due to increased use of natural barriers to fire spread such as rock outcroppings, streams, rivers, bare ground, and roads), the potential for introduction of invasive species would be less than the no action alternative.

Within ponderosa pine woodland, the proposed action would result in increased age class diversity, reduced canopy cover of both pine and understory Gambel oak and new growth of grasses, forbs, and resprouting of shrubs. Areas of low and moderate severity within the same fire would increase edge habitat diversity, increasing the value to numerous wildlife species. Surface disturbing activities would be less than the no action alternative, limiting the potential for invasive species introduction and spread.

4.2.3.2 Shrublands

The proposed action encompasses 48,270 acres of sagebrush shrubland and steppe, and 9,455 acres of mountain shrubland.

Within sagebrush shrubland and steppe, the proposed action encompasses areas of predominantly big sagebrush on upland areas in deep soils. The proposed action would result in a reduction of decadent sagebrush stems, an increase of perennial grass germination, and a reduction of encroachment of pinyon and juniper trees. While the proposed action does not extend to occupied Gunnison Sage Grouse habitat, the unoccupied habitat would benefit from a reduction in canopy cover and raptor perch, potentially allowing for the future use of the unoccupied habitat by the grouse. The proposed action would limit the potential for establishment and

spread of invasive species by reducing surface disturbing activities associated with fire suppression.

The proposed action would increase the amount of early successional class mountain shrubland, and since it occurs adjacent to sagebrush communities, would allow for the expansion of sagebrush. New sprouts from roots would encourage big game species to utilize these areas over adjacent private lands, which would likely further increase sagebrush expansion. Heterogeneity of mountain shrub stands would support mixed severity fire in the future, reducing widespread areas of replacement severity fire and associated deleterious fire effects.

4.2.3.3 Grasslands

The 17,398 acres of grassland are evenly distributed throughout the proposed action area among introduced grassland, semi-desert grassland, and mountain grasslands. Grassland response from the proposed action would be similar across all types.

Fires burning through grasslands typically move quickly and only impact the aboveground portion of the plants. Immediately below the soil surface, temperatures rarely exceed 125° F (Tester, 1965). Since most rhizomatous grasses roots are a few inches below soil surface, they are rarely impacted by fire and will resprout immediately after disturbance. Within the proposed action area, grasslands occur as meadows within and adjacent to other shrubland or forested vegetation types. These meadows would be maintained by the proposed action, and fescue cover would be increased while litter loadings decreased.

Areas of cheat grass within the proposed action area would reestablish after fire, potentially spreading to a limited extent into adjacent burned areas. However, the amount of cheat grass expansion would be limited by the invasive species monitoring and treatment design features of the proposed action, as well as the lower amount of surface disturbance than the no action alternative.

4.2.4 Fire Management & Fire Ecology

The proposed action would lead to an increase in the area burned per year for the next ten years. The past twenty years have had an average of 865 acres per year burn. The proposed action would allow fire managers to manage natural ignitions under carefully considered conditions for an additional average of 1,000 acres per year of area burned, for a total annual average acreage of 1,865 acres per year. This number includes fires which would likely be managed for minimizing fire size and protection objectives, as well as fires managed to meet goals and objectives as identified in the Tres Rios RMP.

In the short term, the proposed action would result in increased wildland fire management costs due to the longer duration nature of fires managed under the proposed action. However, in the long term, fires managed under the proposed action would serve as fuel breaks to future fires, resulting in increased tactical options for fire managers as well as reducing overall suppression costs due to smaller future fire size. Costs resulting from fire impacts to private land, infrastructure, and improvements would also be lower in the long term due to lower risk of high intensity fire impacting these values.

Additional outputs of FRCCmt are "Reference Severity," and "Current Severity" rasters. Based on a number of factors, including observed fire history, S Class distribution, vegetation type, and presumed historic conditions, these layers spatially depict fire severity that would be expected under reference historic conditions (Figure 4.2.4.1), and current conditions (Figure 4.2.4.2). The current severity raster was compared with observed burn severity from Monitoring Trends in Burn Severity (remotely sensed burn severity data, MTBS) data for 12 fires within or directly adjacent to the planning area (Table 4.2.4.1)(MTBS, 2015). Based on the comparison of FRCCmt Current Severity and MTBS observed severity rasters, the Current Severity layer is a close match to observed MTBS data when analyzing fires which burned at Energy Release Components (ERC) above the 85^{th} percentile (Figure 4.2.4.3).

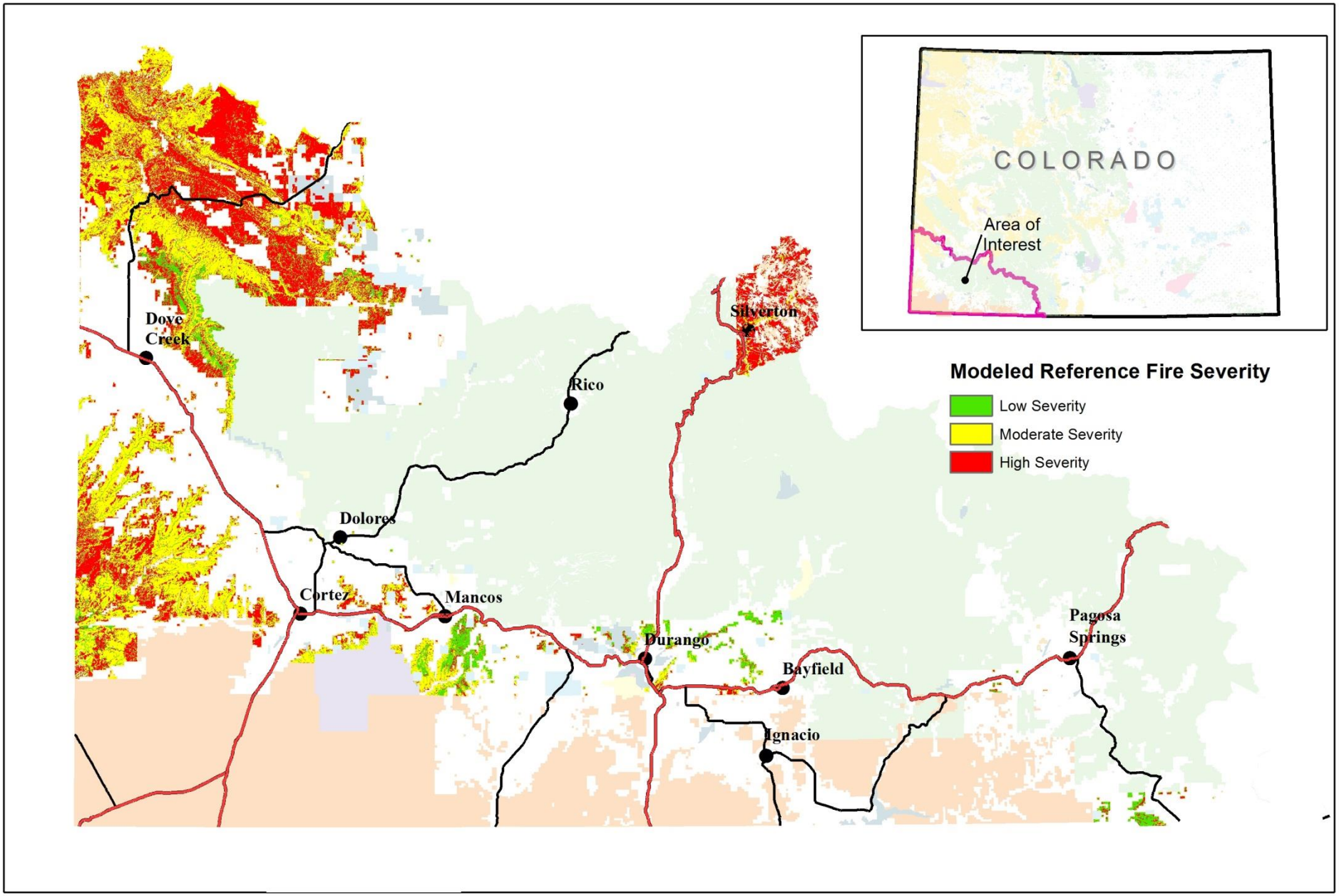


Figure 4.2.4.1: FRCCmt Modeled Reference Fire Severity

User Name: bpietruszka
Date: 11/5/2015
Time: 9:41:53 AM

1:900,000

0 5 10 20 30 40 Miles

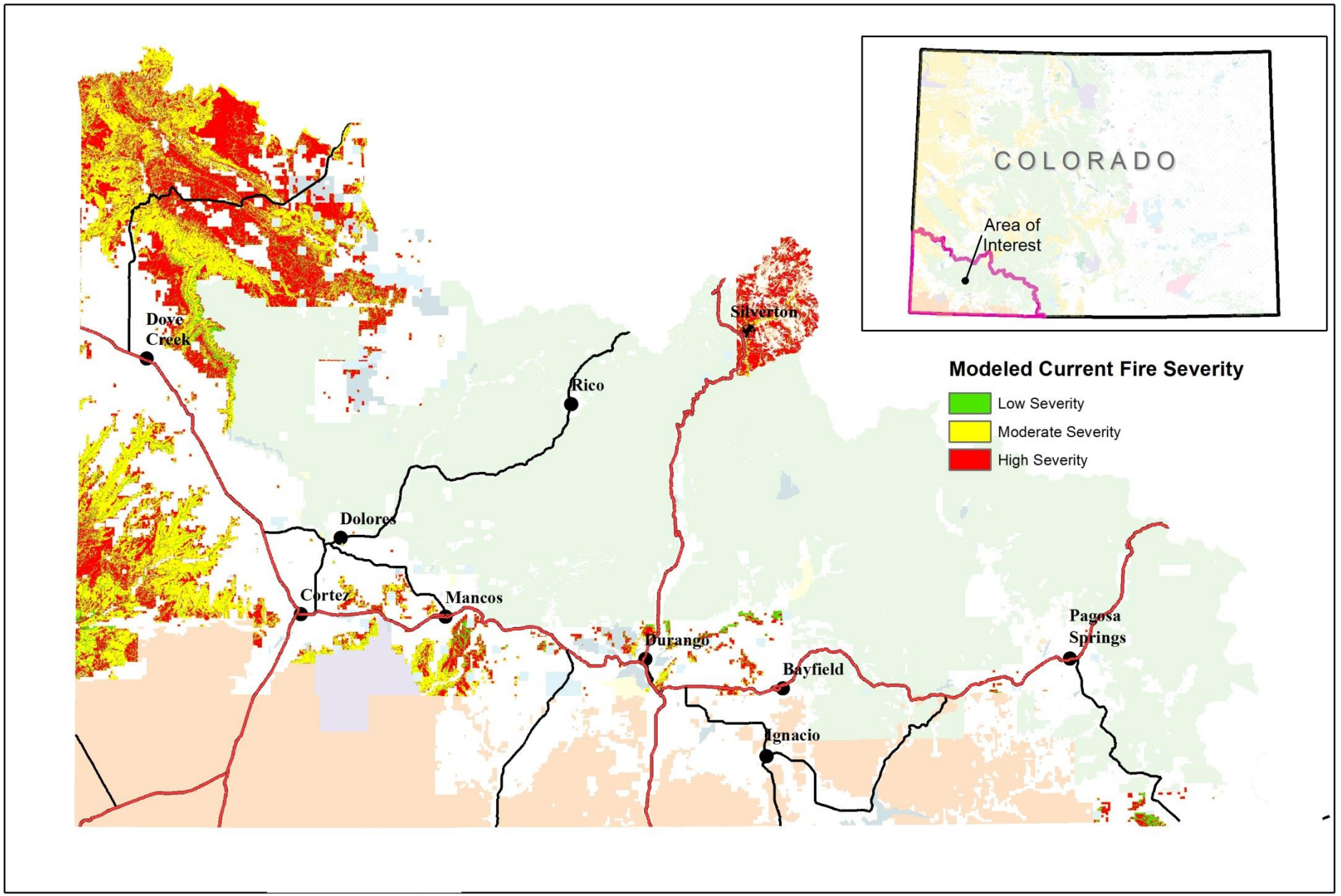


Figure 4.2.4.2: FRCCmt Modeled Current Fire Severity

User Name: bpietruszka
Date: 11/5/2015
Time: 9:51:07 AM

1:900,000

0 5 10 20 30 40 Miles

Table 4.2.4.1: Observed and predicted fire severity quantities for 12 fires (MTBS and FRCCmt data)										
				MTBS Data			***FRCCmt Current Severity Layer Prediction***			
Fire Name		**Date**	**Final Fire Size (ac)**	**Observed Low Severity Acres**	**Observed Moderate Severity Acres**	**Observed High Severity Acres**	**Predicted Low Severity Acres**	**Predicted Moderate Severity Acres**	**Predicted High Severity Acres**	**ERC Percentile 5 day**
Represented well by *Current Severity* layer; primarily suppression strategy fires occurring during high ERC's	Hovenweep	7/22/2000	1,152.35	220.82	434.78	4,96.74	59.13	595.96	497.26	85.45%
	Pony	8/2/2000	5,232.78	1,242.01	1,800.16	2,190.62	139.36	3,391.59	1,701.83	85.45%
	Bircher	7/20/2000	23,351.23	4,669.06	5,895.29	12,786.88	1,505.45	8,295.81	13,549.97	87.61%
	Menefee	6/28/1990	1,190.20	267.62	539.08	383.50	128.74	303.59	757.87	85.45%
	Weber	6/22/2012	10,912.09	2,737.42	4,395.02	3,779.65	2,758.28	2,597.43	5,556.38	99.34%
	Well	8/29/2004	1,178.38	851.97	326.41	0.00	92.30	514.97	571.11	87.61%
	Hamilton	7/19/2003	1,851.14	330.88	409.77	1,060.48	203.55	1,175.90	471.68	96.44%
Represented well by *Reference Severity* layer; these fires were either prescribed fires or managed under alternate strategies than perimeter control	Narraguinnep	8/7/2009	7,811.89	3,835.01	2,513.69	1,463.20	1,080.87	2,691.83	4,039.19	86.95%
	Bradfield	8/2/2009	2,553.44	1,605.77	602.90	344.76	305.52	578.85	1,669.07	74.62%
	Far Draw WFU	9/11/2005	1,169.87	1036.92	115.98	26.70	206.62	240.65	722.60	45.10%
	Dolores Rim Phase 5 Rx	5/21/2005	901.55	694.33	189.95	17.27	104.87	30.95	765.73	78.32%
	Sharps Draw Rx	9/23/1998	965.18	756.04	205.70	3.43	124.96	110.95	729.28	84.61%

Burn Severity Legend
(Same for all 3 frames)

- Low Severity
- Moderate Severity
- High Severity

Manoos

Manoos

Manoos

FRCCmt Modeled Reference Severity Predictions		
Predicted Low Severity Acres	Predicted Moderate Severity Acres	Predicted High Severity Acres
6,313.59	2,653.24	1,945.28

FRCCmt Modeled Current Severity Predictions		
Predicted Low Severity Acres	Predicted Moderate Severity Acres	Predicted High Severity Acres
2,758.28	2,597.43	5,556.38

MTBS Observations		
Observed Low Severity Acres	Observed Moderate Severity Acres	Observed High Severity Acres
2,737.42	4,395.02	3,779.65

Figure 4.2.4.3: FRCCmtReference, FRCCmt Current Severity, MTBS Observed Severity Comparison
2012 Weber Fire, 10,912.09 acres, 99th percentile ERC

User Name: bpietruszka
Date: 11/5/2015
Time: 2:15:59 PM

1:75,000

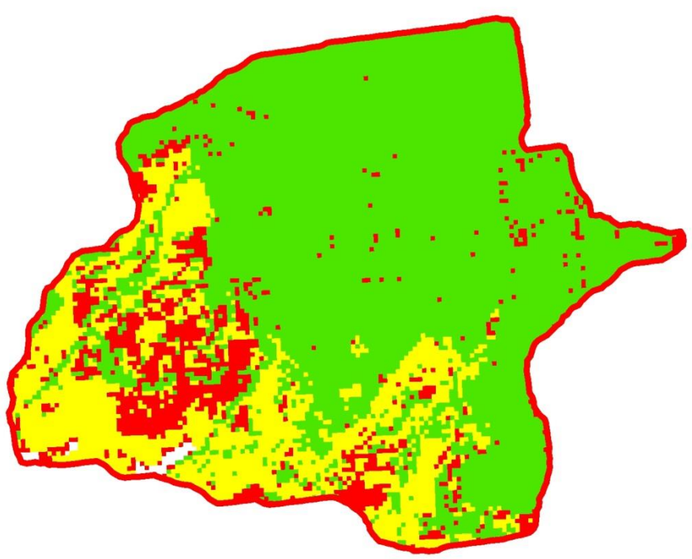
0 0.75 1.5 3 4.5 6 Miles

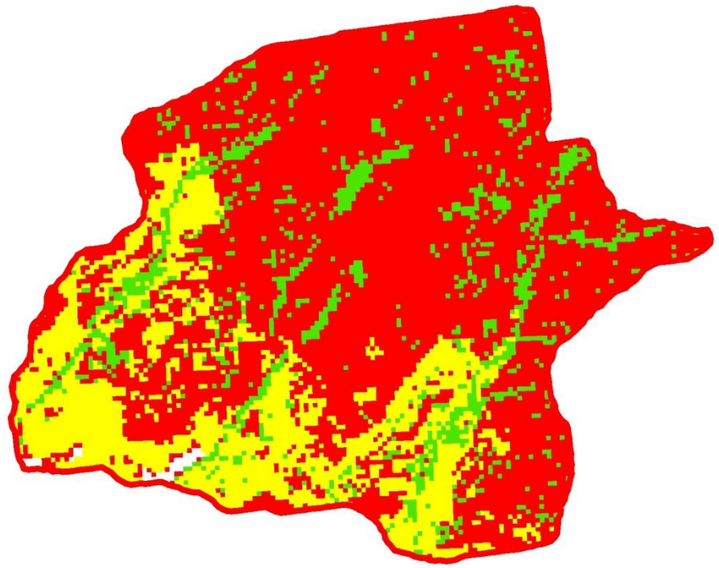
N W E S

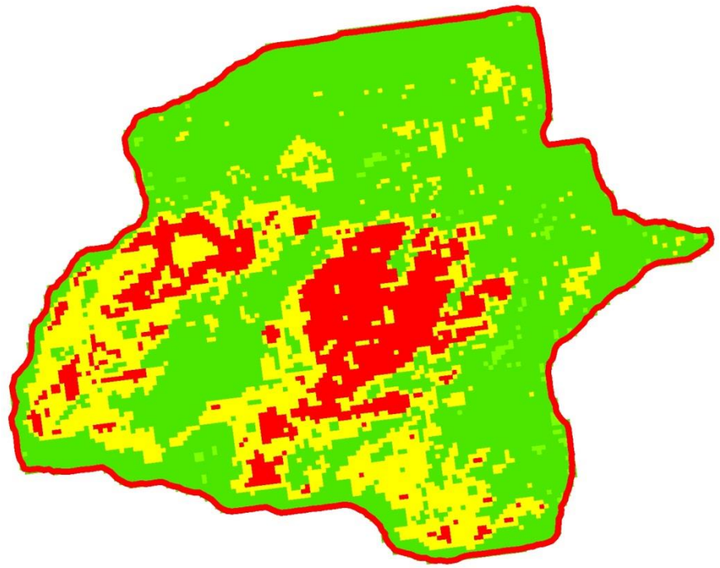
Legend
Highway
U.S.
State
BLM
USFS
BIA
NPS
STATE
BOR
DOD
LOCAL
OTHER
PRIVATE

Burn Severity Legend
(Same for all 3 frames)

- Low Severity
- Moderate Severity
- High Severity







FRCCmt Modeled Reference Severity Predictions		
Predicted Low Severity Acres	Predicted Moderate Severity Acres	Predicted High Severity Acres
1,761.35	592.45	199.65

FRCCmt Modeled Current Severity Predictions		
Predicted Low Severity Acres	Predicted Moderate Severity Acres	Predicted High Severity Acres
249.06	471.88	1360.62

MTBS Observations		
Observed Low Severity Acres	Observed Moderate Severity Acres	Observed High Severity Acres
1605.77	602.90	344.76

User Name: bpietruszka
Date: 11/5/2015
Time: 2:14:33 PM

Figure 4.2.4.4: FRCCmtReference, FRCCmt Current Severity, MTBS Observed Severity Comparison
2009 Bradfield Fire, 2,553.44 acres, 74th percentile ERC

1:38,299

0 0.475 0.95 1.9 2.85 3.8 Miles

N E S W

At ERC's below the 85th percentile, the Current Severity layer drastically over predicted the amount of high fire severity, and under predicted both the amount of low and moderate fire severity. At ERC's below the 85th percentile, the FRCCmt Reference Severity layer is a much better statistical fit to MTBS observed fire severity. If the proposed action is implemented when the running five day average ERC values are below the 85th percentile, fire severity would be expected to be within historic values, and more accurately depicted by the Reference Severity layer (Figure 4.2.4.4 illustrates a fire that was managed to meet resource objectives when ERC's were below the 85th percentile).

While fire severity does not predict ecosystem responses well across vegetation types (for instance high severity fire affects ecosystem responses differently in ponderosa pine and sagebrush shrubland and steppe), what this analysis does show is that fire severity is likely to be within the historical range of variability of each vegetation type if the proposed action is implemented below 85th percentile ERC's. Since the fire severity would be within the HRV, it follows that ecosystem responses would also be within the HRV in each vegetation type.

In order to determine the areas in which the proposed action has the highest probability of occurring, FlamMap5 – MTT "Randig" (Finney, et. al, 2016) was run across a calibrated fire environment (LANDFIRE 2012 data with local adjustments) at weather and fuel moisture conditions representative of the 85th percentile ERC's (the maximum limit of the proposed action) within the fire emphasis area. FlamMap is a spatial fire behavior model which can be used in order to quantify probability across landscapes. Based on the proposed action and the associated design features, 10,000 random ignitions were allowed to burn across the landscape for 12 hours unabated. Each random ignition is then "stacked" upon every other one in order to determine a conditional burn probability (BP, the probability that a wildfire occurring during specified conditions will burn a pixel (Scott, et. al, 2013)) for the proposed action emphasis area (Figure 4.2.4.5). Additionally, each pixel value for Conditional Flame Length (CFL, an estimate of the mean flame length of the simulated fires which burned the pixel (Scott, et. al, 2013) was calculated and summarized in Figure 4.2.4.6. Figure 4.2.4.7 identifies FlamMap simulated fire perimeters greater than 100 acres.

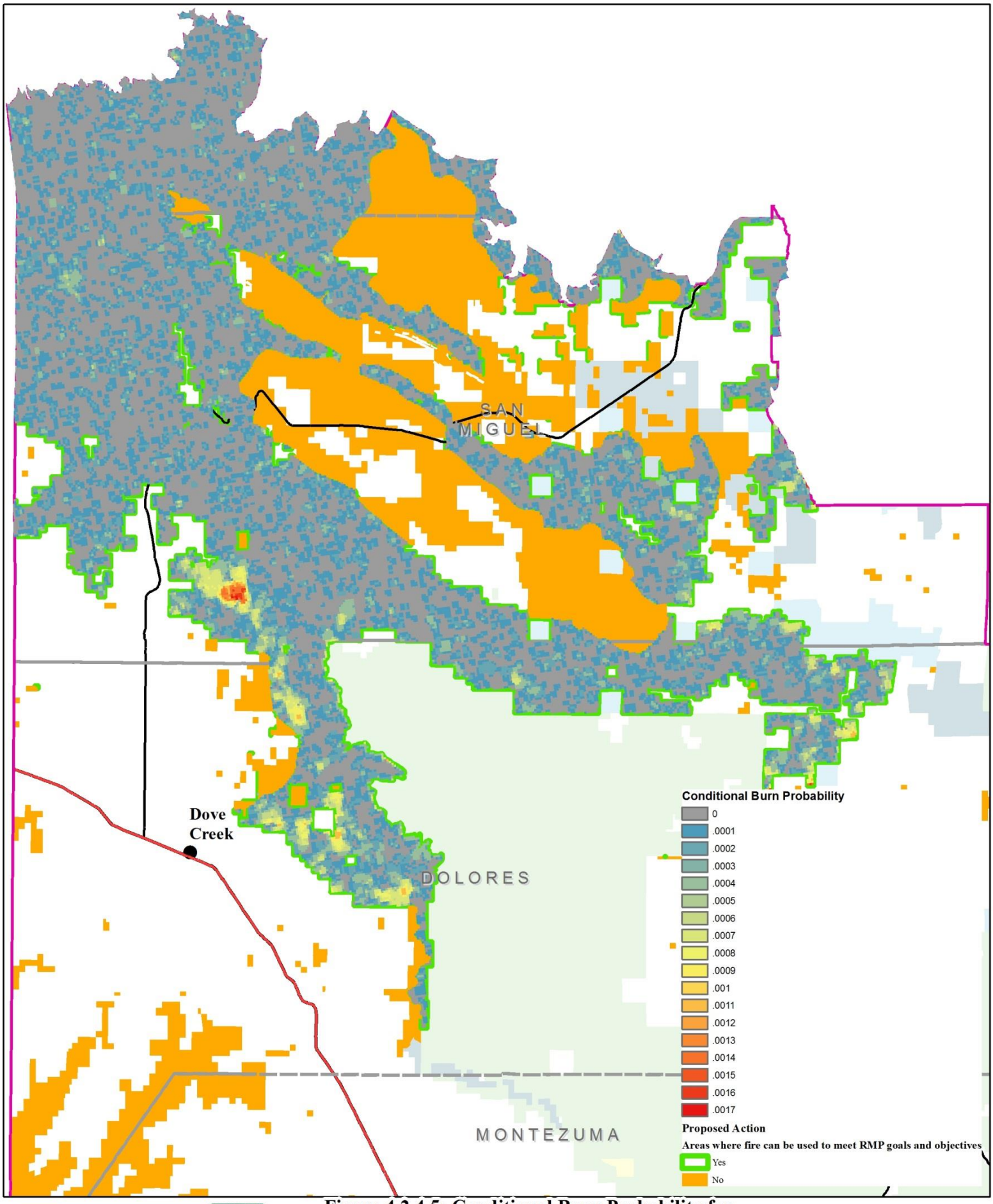


Figure 4.2.4.5: Conditional Burn Probability for Proposed Action Fire Emphasis Area, 85th Percentile ERC (Maximum under Proposed Action)

User Name: bpietruszka
Date: 3/22/2016
Time: 12:43:06 PM

1:325,000

0 1.75 3.5 7 10.5 14 Miles

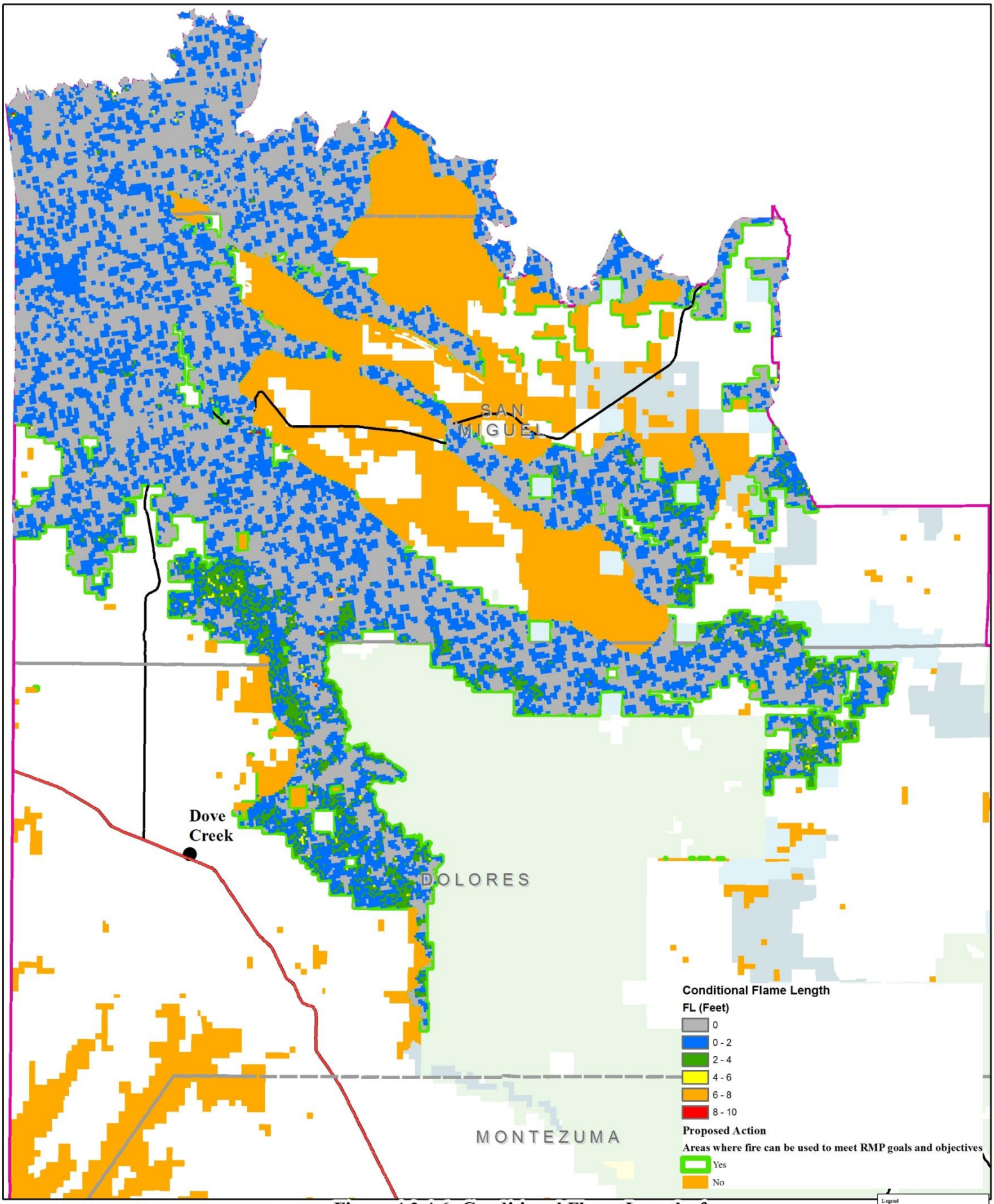


Figure 4.2.4.6: Conditional Flame Lengths for Proposed Action Fire Emphasis Area, 85th Percentile ERC (Maximum under Proposed Action)

User Name: bpietruszka
Date: 3/22/2016
Time: 12:42:04 PM

1:325,000

0 1.75 3.5 7 10.5 14 Miles

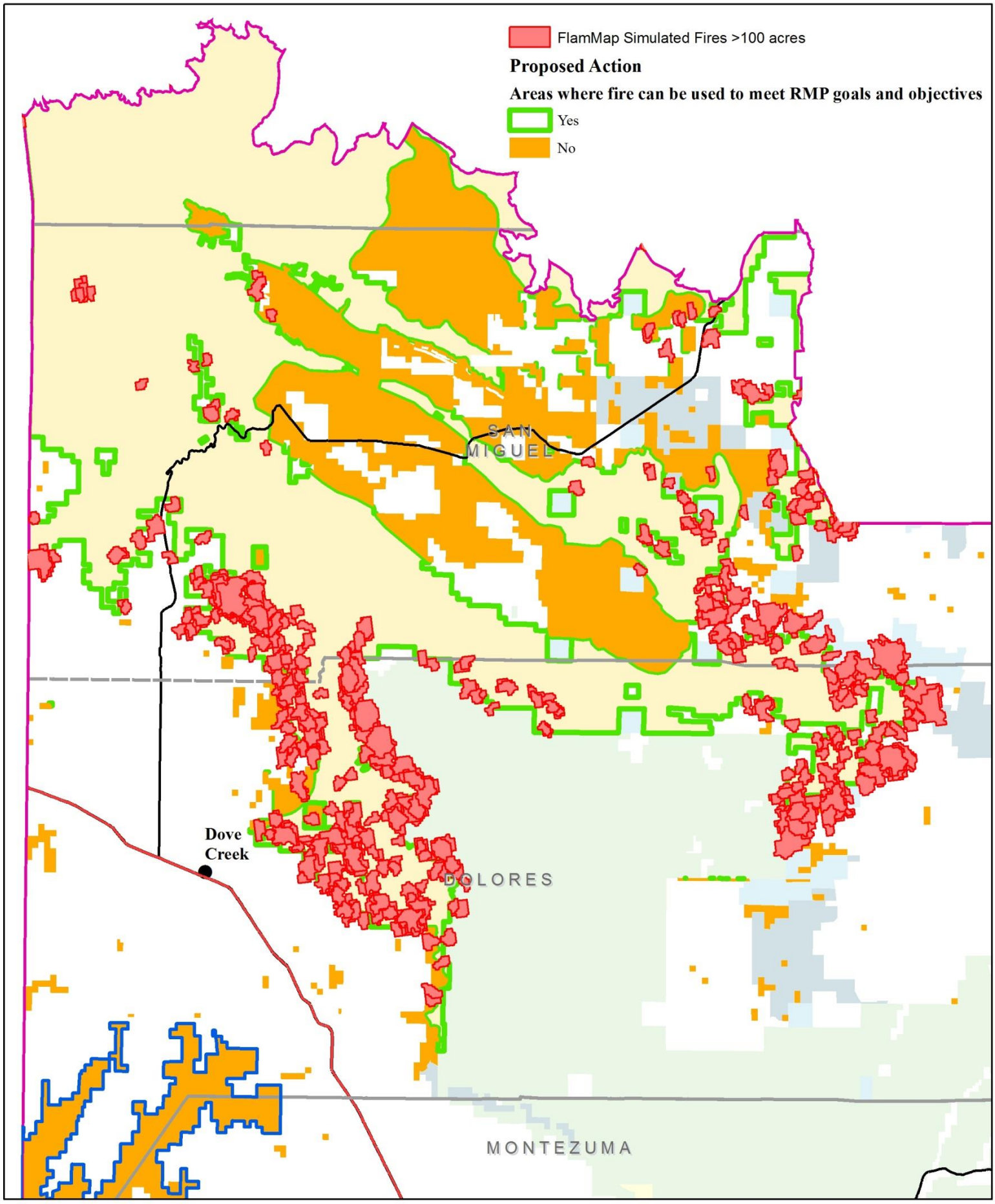


Figure 4.2.4.7: Simulated Fire Perimeters >100 acres Which Burned Within or Onto the Proposed Action Fire Emphasis Area

User Name: bpietruszka
Date: 3/16/2016
Time: 10:57:16 AM

0 1.75 3.5 7 10.5 14 Miles

The FlamMap BP results show that the proposed action has the highest probability of occurring east and northeast of both Dove Creek and Egnar, Colorado. This area shows the highest value of .0017, or roughly a 17/1000 odds of burning under the prescribed conditions, presuming a fire occurs somewhere on the landscape under those conditions. Another relative hotspot is north of Lone Mesa State Park and south of Disappointment Valley on the area near South Mountain, and another near McKenna Peak WSA. The majority of the modeled fires within the landscape (55%) did not ignite or burn onto the proposed action fire emphasis area. Of the remaining 45% which did, only 16% (7.24% of all simulated fires) of those were larger than 100 acres, with a maximum simulated fire size of 1,335 acres, a mean simulated fire size of 267 acres, and a median simulated fire size of 208 acres.

The large areas shown as either zero or near zero burn probability are reflective of the reality that in the past twenty years, only a small handful of fires occurred in these areas. Fuels in the proposed action fire emphasis area where the BP is zero or near zero are typically scattered pinyon/juniper with little or no surface fuel. While it is likely that there are a significant number of ignitions in this area, it is so remote that the majority are never detected and burn out naturally after burning only a handful of trees.

The one area which was not modeled yet is part of the proposed action fire emphasis area is Menefee Mountain and Weber Mountain WSA's, south of Mancos, Colorado. The 2012 Weber fire burned the entirety of Menefee Mountain, and the 2000 Bircher Fire burned the area to the west of Weber Mountain. To the south, the 2005 Trail East Fire occurred, and to the north is the Mancos Valley and unburnable agricultural fuels. Conditional Burn Probability would not be reflective of relative conditions in this area. However, fires which have occurred in the area under similar conditions typically burned relatively small areas (0.1 to 3 acres) with minimal fire severities. Under conditions prescribed by the proposed action and design features, fire behavior in this area is also expected to be relatively benign compared to under higher fire weather indices.

4.2.4.1 Forested Lands

4.2.4.1.1 Pinyon-Juniper Woodland

The majority of the acreage within the proposed action area is pinyon-juniper woodland (178,390 acres). By increasing the area burned per annum, the proposed action would benefit this vegetation type by shifting the S Class distribution towards historic values. Specifically, the overabundance of S Class D (49.16% in the planning area) would be the most heavily influenced by the proposed action. Additional disturbance in the form of mixed severity fire would tend to move this S Class to S Class A (early succession, open canopy). Over time, the proposed action would shift S Class distribution towards historic values, as well as increasing patch size and density across the proposed action area. The effect of increased patches would be resilience within pinyon-juniper woodland to effects exacerbated by climate change and future large scale, replacement severity fire which may be uncharacteristic in the HRV.

If the proposed action is selected, fire severity within pinyon-juniper woodland would likely be mixed severity due to the *Ips* beetle epidemic, which reduced canopy cover across the majority of this vegetation type. The proposed action would be implemented during times in which

environmental conditions and fire weather indices were below critical thresholds, which further supports a mixed severity fire regime.

4.2.4.1.2 Ponderosa Pine Woodland

Effects of the proposed action on ponderosa pine woodland would be beneficial in both the short and long term. Reintroduction of fire as a critical natural process would increase heterogeneity of stand age and composition across the proposed action area. Allowing naturally ignited fires to burn under carefully chosen conditions would increase the resilience of this vegetation type to changes brought on by climate change and past management actions. FRCC would continue to be shifted towards historic values, and S Classes would begin to shift towards historic distributions, including an increase of S Class A and associated seedling and sapling trees. Understory Gambel oak would be present in various age classes and would still act as a ladder fuel in some areas, supporting mixed severity fire. In other areas, low severity fire would occur in the moderated conditions of the proposed action. The proposed action would promote resilience in ponderosa pine stands from future wildfires which may occur during periods of extreme fire weather indices by increasing patch size and density. The proposed action would limit the spread of the roundheaded pine beetle within the planning area by promoting a diversity of S Classes adjacent to one another, including more old growth and very young individual trees.

4.2.4.2 Shrublands

4.2.4.2.1 Sagebrush Shrubland and Steppe

Within the proposed action area, sagebrush shrubland and steppe are intermixed with pinyon-juniper woodland and mountain shrubland communities. Under the proposed action, in the short term, sagebrush shrubland would experience more acres burned near the edge of where it mixes with other vegetation types. Due to fire importation from the adjacent vegetation types, the most likely effect from the proposed action would be that old, decadent sagebrush stems are burned, due to their proximity to encroaching vegetation which experiences a higher rate of ignition.

In the long term, the proposed action would lead to an increase in the coverage of sagebrush across the planning area, due to the ability of mountain big sagebrush (the dominant type within the proposed action area) to colonize a burned area more rapidly than pinyon-juniper woodland. In areas where mountain shrubland has encroached upon sagebrush, the more palatable mountain shrub species would be preferentially grazed by native ungulates to the benefit of sagebrush and sagebrush obligates. This would lead to an expansion of sagebrush shrubland and steppe in the long term.

By limiting surface disturbance, the proposed action would favor the reestablishment of native species after fires. Combined with invasive species monitoring and treatment, the proposed action would increase the overall resiliency of sagebrush shrubland and steppe within the planning area to future wildland fire.

4.2.4.2.2 Mountain Shrubland

The majority of mountain shrubland within the planning area is within the proposed action area. In the 9,445 acres of mountain shrubland within the proposed action area, the majority has seen

some form of disturbance in the past twenty years. The proposed action would continue to maintain a healthy S Class distribution within the HRV, and continue to both maintain FRCC within the HRV in some areas as well as move it towards historical values in others.

Under the proposed action, mixed severity fire would continue to occur, but would be unlikely to burn large areas as it has within and adjacent to the planning area in the past. Future resiliency to wildfire would be improved upon by promoting heterogeneity within mountain shrublands. In areas where mountain shrubland has overtopped sagebrush, the proposed action would generate resprouting, which would likely be preferentially grazed by native ungulates to the advantage of sagebrush during the post fire reestablishment period.

4.2.4.3 Grasslands

The proposed action would likely little effect upon grasslands. Current areas of grassland would be maintained by periodic fire, but limited expansion would occur due to robust seed sources and other adaptations to fire by vegetation within the proposed action area. Grasslands would recover rapidly from fires managed under the proposed action, but due to seasonality restrictions, many grasslands would not be cured (having low levels of moisture content) enough to carry fire during the times of year when the proposed action would be implemented. In areas where grasslands are fairly large, they would likely be used as holding features for fires in adjacent vegetation types.

4.2.5 Wildlife

4.2.5.1 Threatened and Endangered Species

4.2.5.1.1 Gunnison Sage Grouse

Direct Impacts to Individuals

Direct disturbance to Sage-grouse in occupied habitat will be avoided during critical periods through the design features of the proposed action. Access through occupied critical habitat will occur after spring lekking and nesting (March 1 - June 30) and before important winter periods. Access to project locations will occur after breeding and before critical winter periods of the year. Access through unoccupied critical habitat will occur throughout the year. Although, no birds are known to exist in unoccupied areas, so impacts to individuals will not occur. These impacts, after design criteria are applied, are thought to have negligible impacts to the species.

Access through critical habitat will be the main form of potential direct disturbance to Sage-grouse. If a disturbance were to occur, the disturbance would be short in duration (fire trucks driving by) and would occur on county roads that currently have residential traffic. Although these roads would experience an increase in activity, the increase would be short in duration and during the summer, after breeding and before winter. It is thought that disturbance during this period only temporarily displaces Sage-grouse.

Impacts to Individuals through Habitat Alteration

The proposed action will only occur within unoccupied Sage-grouse habitat (with the exception of access as discussed above). Unoccupied areas consist largely of sage-shrub areas that have been heavily invaded by ponderosa pine and pinyon-juniper on their periphery (Gambel oak, another primary vegetation type to be treated with the proposed action, will be addressed below). Impacts to Sage-grouse will largely focus on these invaded fuel types that have encroached into the sagebrush steppe due to their propensity for ignition. When combined with other treatments, reduction of these fuel types, which could occur under this alternative, will increase the amount of available suitable habitat to Sage-grouse and largely be a benefit to the species as a whole. Burning alone will not increase the amount of available habitat to Sage-grouse. Burning will aid in the removal of over story vegetation and make future habitat improvement projects more feasible.

Sage-grouse occupy habitats that are intermixed with Gambel oak regularly. However, certain densities, anecdotally, are thought to decrease habitat effectiveness for Sage-grouse due to replacement of key elements of their habitat. Reduction in fire frequency over the last century has increased the amount of Gambel oak in sagebrush environments. Fire has been shown to reduce Gambel oak densities during the summer. However, because fire reduces competition to re-sprouting oak, oak recovers well, and oak stores carbohydrates in its roots, Gambel oak has been shown to increase in density after single treatments during most periods of the year when it can utilize decreased competition and carbohydrate storage to proliferate (Abella and Fule 2008). Treatment of habitats that are primarily or secondarily oak during the summer will improve habitat for Sage-grouse while treatment during other periods of the year will further degrade habitat.

4.2.5.1.2 Gunnison Sage-grouse Critical Habitat

Only areas that are predominantly over story vegetation such as gambel oak, ponderosa pine or pinyon juniper will be targeted under this alternative for burning. In many of the habitats that are in unoccupied habitat there is a considerable amount of over story vegetation. Using fire to control over story vegetation is an efficient means to remove vegetation that is contributing to unsuitable conditions for Sage-grouse.

If burning is to occur in a manner that will increase the amount of available sagebrush habitat, some sagebrush will be lost. However, many of the habitats that this will be occurring in areas that are not currently being used by Sage-grouse because they contain either trees – which to a large degree are avoided by Sage-grouse, or they have a large shrub component of mountain mahogany or Gambel oak. Although sagebrush will be lost, the loss will be overshadowed by the treatment trees and other large shrubs, aiding managers in their efforts to create more suitable habitat.

4.2.5.1.3 Mexican Spotted Owl

Direct and Indirect Impacts

Impacts to MSO will only occur to potential habitat as there are no known MSO nests or occupants within the planning area. Nesting habitat for MSO within the planning area occurs in

canyon habitats on cliff benches that have few old large trees, or on cliff faces. Neither of these nesting areas will be directly impacted by the proposed action, but the proposed action will potentially occur within a close proximity to these habitats.

In the ponderosa pine, an important habitat for MSO, the majority of the scenarios within this proposed action will likely produce low intensity fire that will slowly move through understory vegetation, with only minor torching occurring in small pockets. In this scenario MSO habitat will be improved, as they rely on older forests for much of their habitat needs. Returning the ponderosa pine to a more historic fire regime would decrease the likelihood of large, high intensity crown fires and increasing resiliency within the system to fire. These benefits would lead to older healthier forests in the long term. The likelihood of stand replacing wildfire will also be decrease under this Alternative. Additionally, this type of management limited to 1,000 acres in size per year, will help improve mosaic structure of the habitat, and will not impact large areas of habitat in a given year. Over the short term, some potential habitat will be negatively impacted by the proposed action. Considering however, that under the no action suppression would be occurring, the differences in alternatives are diminished over the short term. Although there may be some impact as a result of a fire managed under the proposed action, there would be an impact regardless with full suppression tactics. Depending on fire size impacts as a result of suppression can be quite large.

Given the low detection rates of surveys within the proposed action area over the last decade, impacts to individuals are extremely unlikely to occur and impact to habitat will largely be beneficial under this alternative.

4.2.5.2 Bald and Golden Eagles

4.2.5.2.1Golden Eagles

Golden eagles typically nest on cliff faces within the proposed project area at all elevations. Some nests occur on large cliff faces well protected from direct disturbance but are still susceptible disturbance within 800m (~1/2 mile) of their nest (Steidl 1993). As practicable, these disturbances will be avoided through sight avoidance when biologists are consulted as resource advisors.

Although golden eagle nest sites are among the most well-known for any raptor species within the planning area (mostly due to their location being visible from roads), not all territories have been identified, and therefore cannot be protected 100% from wildfire. Although, given the size of the project (1.000 acres per year) and typical nest site location, impacts to nest sites would be very unlikely. If impacts do occur they will not be different from the no action. In any wildfire situation there is the potential for the loss of a nest. Under this alternative, more protection will be provided through resource advisors.

4.2.5.2.2 Bald Eagle

Bald eagle nests can be found in ponderosa pine near water. Most known nests are located in Cottonwood galleries. Although ponderosa pine nests are infrequent throughout the proposed

action area, some do occur and unidentified nests in the pine could be impacted by the proposed action. However, given the size of the proposed action, these impacts are very unlikely to occur and will be avoided or minimized as much as possible during implementation.

Nests located in cottonwood galleries will largely be avoided due to design criteria.

4.2.5.3 Migratory Birds

4.2.5.3.1 Impacts to Raptor Habitat and Individuals

One thousand acres of raptor habitat may be impacted a year for up to ten years under the proposed action. Most impacts to habitat will be positive, primarily, by reducing the likelihood of catastrophic stand replacing fires in the ponderosa pine, opening pockets in the PJ of earlier successional states (creating a diversity of habitat), and increasing snag densities in all forested fuel types for nesting and prey habitat.

Given raptor nest site densities, there's a high probability that there will be a raptor nest somewhere in most fires that occur in the ponderosa pine and pinyon juniper, and that in some cases, raptor nest will be lost. If possible under this alternative known raptor nests will be avoided. However, no raptor surveys will be conducted prior to each treatment; given that ignition will be natural and random. Some raptor individuals and habitat will be lost for the year, or permanently, as is the case for pinyon-juniper (Given densities of raptor nests in pinyon-juniper, nest site availability is not a limiting factor in local populations). These losses will be very small in number and will be to the benefit of future populations.

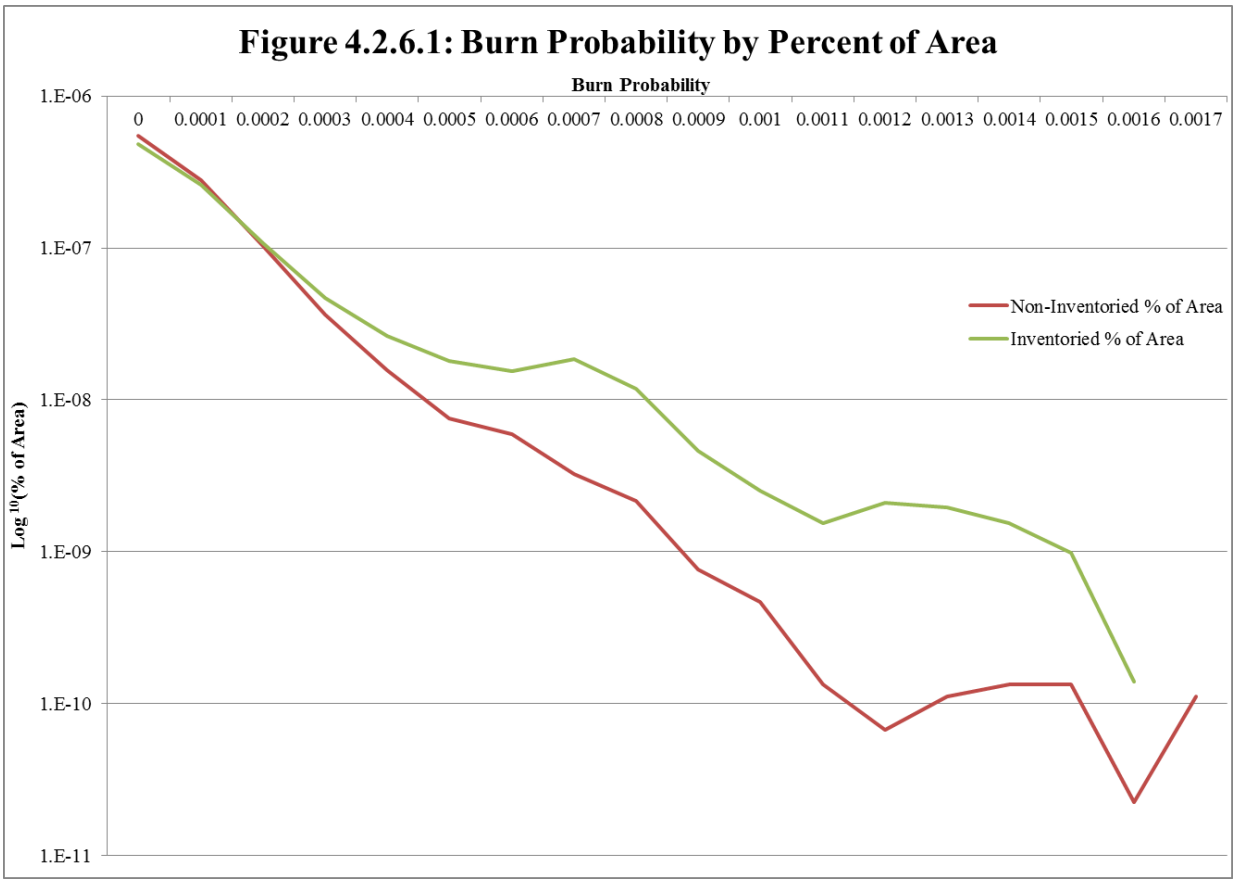
4.2.6 Cultural Resources

The direct and indirect impacts of wildland fires (in particular higher severity/intensity wildland fire) on cultural resources are described under the no action alternative. As site density is variable throughout the 304,450 acre proposed action area, and only 13% of this area has been inventoried for cultural resources, and no more than 10,000 acres of fire managed for resource benefit would occur over the life of this EA (10 years), a qualitative analysis is appropriate.

Under the proposed action, managed wildland fires could be allowed to burn for resource benefit. Naturally ignited wildland fires would only be allowed to burn under conditions which are conducive to meeting resource objectives. These conditions occur during times of the year when 5 day average Energy Release Components of NFDRS Fuel Model G are below the 85th percentile. Due to this design feature, fires managed for resource benefit would typically burn with less severity and intensity than incidences of wildland fire fully suppressed for protection objectives. Moderated wildland fire behavior has less potential to directly and indirectly impact cultural resources.

Within the 304,450 acres in which naturally ignited fires could be allowed to burn, the highest wildland fire burn probabilities (Figure 4.2.4.5) correspond to areas of lower archaeological site density (indicated by environmental factors and archaeological survey results). The burn probabilities are lower in the portions of the proposed action area that lack archaeological inventory. Approximately 82% of the non-inventoried area won't burn under the proposed action conditions.

In areas of higher burn probability, expected flame length is low due to periodic incidents of wildland fire (Figure 4.2.4.6, Figure 4.2.6.1). In the remainder of the 304,450 acres, the wildand fire burn probability is low. If a naturally ignited fire occurs, it is unlikely to spread (Figure 4.2.4.7).



The chances of managed wildland fire adversely affecting National Register listed and eligible sites is very low. The proposed action design features further ensure no adverse effects would occur. In comparison with escalating wildland fire severity expectations under the no action alternative, and a corresponding increase in potential impacts to archaeological sites, managed wildland fire should directly and indirectly benefit cultural resources.

The potential impacts of wildland fire suppression methods on cultural resources are described under the no action alternative. Wildland fires managed for resource benefit can involve partial, more minimal, or no fire suppression actions, in comparison to incidences of wildland fire fully suppressed for protection objectives. No suppression actions, or partial or reduced suppression methods, would result in less direct and indirect impacts on cultural resources.

Emergency stabilization and post-fire rehabilitation (ESR) work has the potential to benefit and impact cultural resources. An ESR plan is developed prior to implementing ESR actions. Avoidance of National Register listed and eligible archaeological sites by site-specific ESR work that could impact cultural resources would be incorporated into the ESR plan.

Per the proposed action design features, a resource protection geodatabase would be created. Information specific to cultural resource avoidance and protection would be available to the Fire Duty Officer and Line Officer during the initial decision making process of determining a strategy for ignitions. Utilization of the resource protection geodatabase should ensure that National Register listed and eligible sites (historic properties) are not adversely affected by managed wildland fire, thus benefitting cultural resources.

4.2.7 Native American Religious Concerns

Responses were received from the Pueblos of Santa Clara, San Felipe and Ysleta del Sur, and the Hopi Tribe. The Pueblo of Ysleta del Sur stated that the project will not adversely affect traditional, religious, or culturally significant sites of the Pueblo. The Hopi Tribe stated that they support avoidance of their ancestral sites. They are concerned about how cultural sites significant to the Hopi may be impacted from wildfire and its treatment within the proposed action area. They also requested additional information on protecting unidentified cultural resources in that may be present in unsurveyed areas within the proposed action. Santa Clara was concerned about how cultural resources would be protected. They requested additional information on site protection and mitigation measures. San Felipe stated that areas of cultural concern to the Pueblo of San Felipe within the Tres Rios Field Office should be given special consideration. As the concern expressed by the Hopi, Santa Clara, and San Felipe has to date been for known cultural resources, the proposed action impacts analysis for cultural resources (Chapter 4.2.6) also applies to Native American religious concerns.

4.2.8 Wild Horses

The Spring Creek Basin HMA is approximately 22,000 acres in size. Subsequently, within the HMA approximately 10,329 acres or 45% are within the salt desert shrub or black sage vegetation type communities which have a fire return interval of between 500 and 1,000 years. An additional 6,742 acres or 29% of HMA occur on either badland soil types with very little vegetation, steep slopes and rock outcrops. Therefore, there are a total of 17,071 acres or 74% of the HMA that is unlikely to be affected by fire. These areas would also provide direct refuge for existing wild horses to escaping either managed or uncontrolled fires which may occur within the HMA.

There are approximately 4,722 acres or 20% of the HMA that consists of pinyon-juniper woodlands. These occur primarily on the steeper slopes along the edges of the HMA. This vegetation community has a shorter fire return interval than the other vegetation communities within the HMA and would be the most likely to be effected by the proposed action.

The proposed action would only be implemented under conditions which are conducive to meeting resource objectives. These conditions occur during times of the year when 5 day average Energy Release Components of NFDRS Fuel Model G are below the 85th percentile. Due to this design feature, fires managed for resource benefit would typically burn with less severity and intensity than incidences of wildland fire fully suppressed for protection objectives.

As a result, any managed fires within the pinyon -Juniper communities would increase the patch size within pinyon-juniper across the landscape increasing the resiliency to the effects from large wildfires. In addition, over the long-term forage availability and productivity of these vegetation types would be improved for the benefit of the wild horses.

4.2.9 Monitoring

Monitoring required under the proposed action is focused on Soils and Water-dependent features, Fire Management considerations, Wildlife, Rangeland Management, Noxious and Invasive Weed Species, and BLM Special Status Plant Species. Monitoring requirements are located in Chapter 2.4, Design Features of the Proposed Action.

4.3 No Action Alternative

4.3.1 Soils and Water-Dependent Features

The no action alternative is for full suppression. In the short term (1-10 years) this alternative has low risk of direct and indirect impacts to soil and water resources because natural ignitions would have full suppression. With full suppression, the intent is to extinguish the fire as soon as possible so the burn is as small as possible. The risk of moderate to high severity burns occurring in watersheds would be reduced compared to managed natural ignition fires allowed under the Proposed Action Alternative. However, slightly reduced risk compared to the Proposed Action alternative does not imply no impact. Even with a full suppression strategy, large burns with significant areas of moderate to high severity burn activity are still expected to occur because under adverse weather and environmental conditions, suppression is not always possible or immediately effective.

In the long term (10 – 50+ years), the risk of increasing the occurrence of large, high severity, difficult to control wildfires would increase slightly under the No Action alternative within fire-dependent ecosystems for two reasons. Historic wildfire suppression in fire dependent ecosystems has increased the occurrence and the cost of uncharacteristic large, high severity burns in the west (Chung, 2015). A continuation of full suppression tactics in all areas of TRFO and CANM would perpetuate historic practices. When a fire occurs that cannot be suppressed quickly, the risk will continue to increase over time that the fire will be uncharacteristically large and severe. In the long term, this carries an associated risk of watershed-damaging wildfires under this alternative.

Large areas of high severity burn activity have the highest potential of having negative effects to watersheds. Large contiguous expanses of exposed soils are susceptible to erosion from precipitation and runoff. The highest rates of erosion occur the first year after a burn (DeBano et al., 1998) and soils that remain in an exposed un-vegetated condition after high severity burns are at increased risk of longer-term erosion.

Erosion that reaches water bodies has the potential to load water, stream channels, and lakes with ash, sediment pollution and debris. This is a concern for both aquatic habitat and for public water supplies. Water supply infrastructure such as reservoirs, ditches, water intakes can sustain damage with sediment and ash loading after significant burns in a watershed

4.3.2 Vegetation, Fire Management & Fire Ecology

Under the no action alternative, fires would continue to occur, and upwards of 98% of those fires would be suppressed at an extremely limited size (0.1 acres or less). The remaining 2% of fires would burn with high intensity and corresponding high severity in most vegetation types. While many vegetation types within the planning area evolved with relatively large areas of high severity fire, many did not, such as ponderosa pine and warm-dry mixed conifer.

Prescribed fires and mechanical vegetation treatments would continue to occur, but likely would not be able to effectively treat the entire planning area to mimic historical disturbance regimes.

Fire management costs would be lower in the short term under the no action alternative, but higher in the long term due to increased future fire size and duration due to the continued horizontal continuity of fuel within the planning area. Costs resulting from fire impacts to private land, infrastructure, and improvements would also be higher than the proposed action if the no action alternative is selected.

Vegetative S Classes would continue to skew towards late stages, and less early S Class vegetation would occur. Sagebrush communities would continue to be encroached by mountain shrubs and pinyon-juniper trees. Ponderosa pine and warm-dry mixed conifer would continue to accumulate surface fuels, and be more highly susceptible to high-severity fire on high ERC days.

Long term, climate change would increase the number of days in which ERC's reach critical thresholds, and fire behavior would correspondingly increase under the no action alternative, where treatments by the proposed action would not create mosaics which could moderate fire behavior and effects. Suppression efforts in the future would likely be met with more challenging fire behavior over a larger area and longer duration than in the past.

The same methodology as Chapter 4.2.4 (FlamMap5 MTT-"Randig", 3,000 ignitions) was used to determine BP and CFL for the same area of the project area as in Chapter 4.2.4, but with near-maximum fire behavior conditions modeled. Due to suppression of all smaller fires at lower ERC categories, the no action alternative skews fire size and intensity levels to higher levels than the proposed action. BP increases across the area significantly, as areas which previously would have slowed or stopped fire spread were modeled as being available to it above the 97th percentile ERC. CFL increases substantially, indicating high severity fire across all vegetation types in extreme fire weather scenarios. Without additional breaks in continuity of fuels, fires can spread unabated across the landscape, burning significantly higher areas at significantly higher CFL's than the proposed action alternative (Figures 4.2.3.1, 4.2.3.2, 4.2.3.3, Table 4.2.3.1). While only 3% of all days exceed this ERC threshold (~11 days/year on average), the no action alternative scenario would yield the greatest fire size, highest fire severity, and highest resistance to control for firefighters.

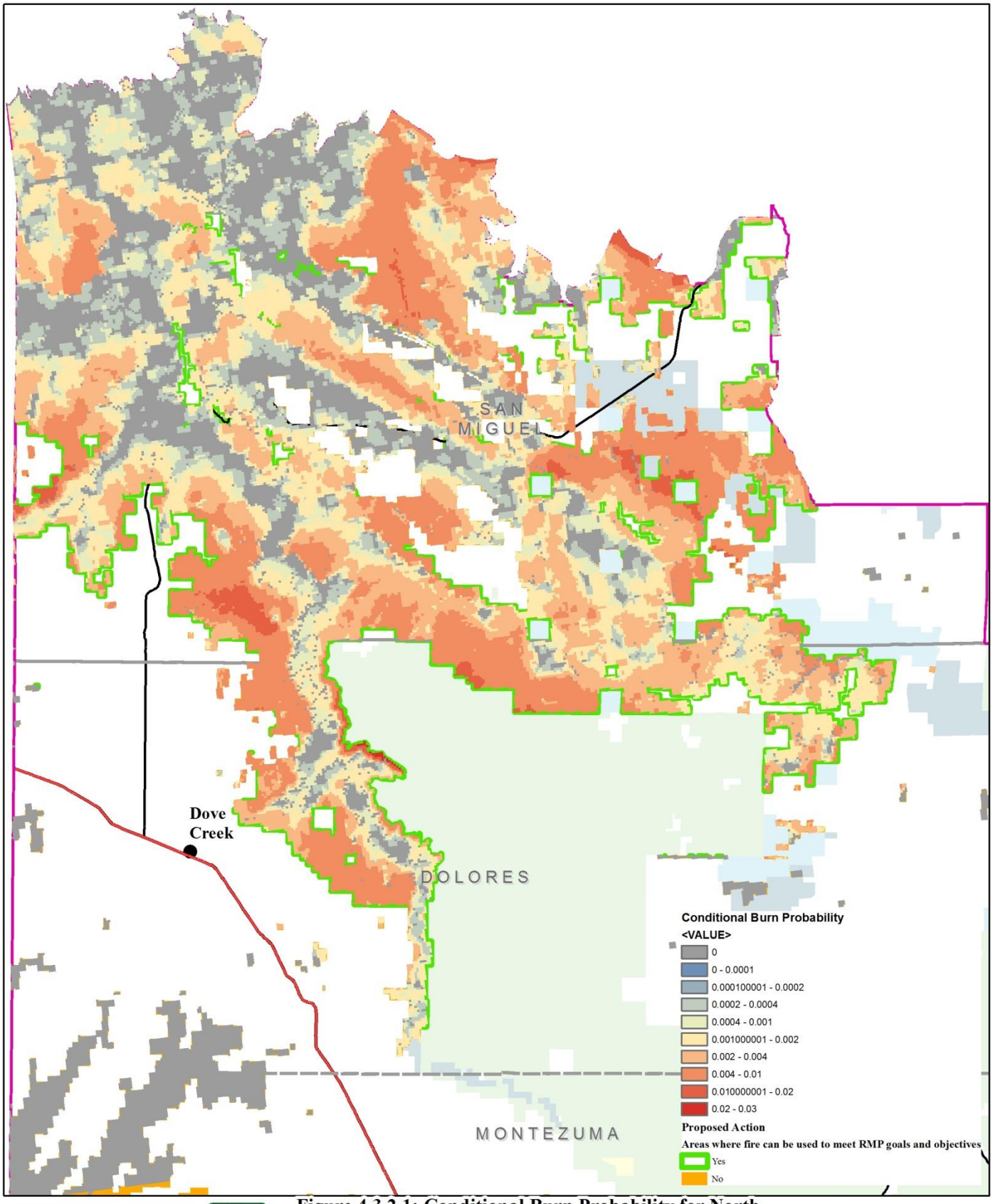


Figure 4.3.2.1: Conditional Burn Probability for North Project Area, Near-Maximum (97th Percentile ERC) Fire Behavior

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0 1.75 3.5 7 10.5 14 Miles

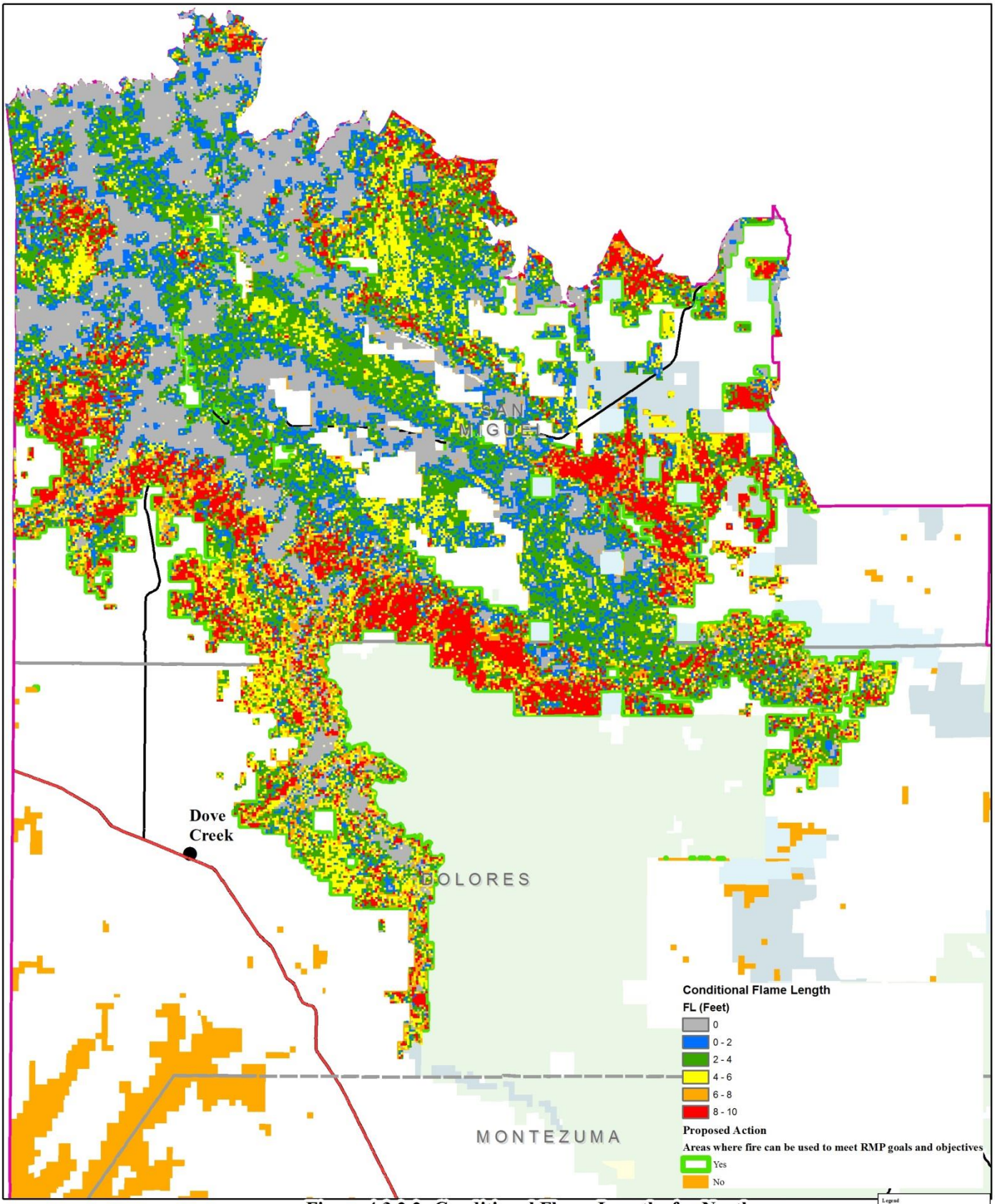

Figure 4.3.2.2: Conditional Flame Lengths for North Project Area, Near-Maximum (97th Percentile ERC) Fire Behavior

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0 1.75 3.5 7 10.5 14 Miles

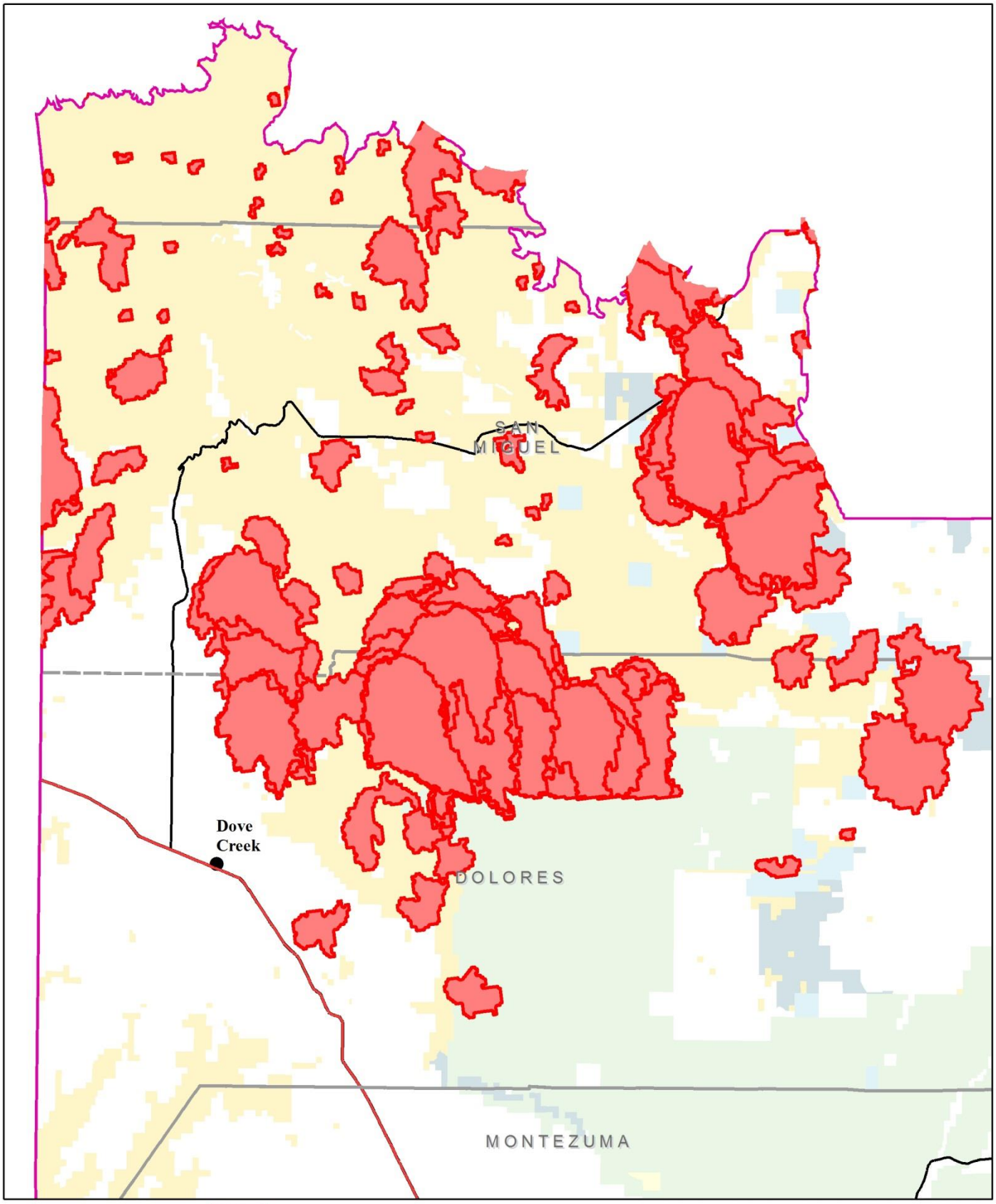

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Figure 4.3.2.3: Simulated Fire Perimeters >100 acres Which Burned Within or Onto BLM Land, Northern Project Area

0 1.75 3.5 7 10.5 14 Miles

Table 4.2.3.1: Proposed Action and No Action Alternative Simulated Fire Size Comparison (ac.) for Simulated Fires Over 100 Acres		
	Proposed Action (85th Percentile ERC)	No Action Alternative (97th Percentile ERC)
Mean	267.9	6,206.7
Median	208.1	7,413.7
Maximum	1,335.8	14,760.0

4.3.3 Wildlife

All wildlife within the proposed action area evolved in habitats that include fire as a natural component. The proposed action will allow naturally ignited wildfires to burn under specific criteria. The following analysis assumes that as a result of the proposed action – and although impacts will my small - there will be a reduction in fuels in treated areas and that a reduction in fuels will decrease the likelihood of larger catastrophic wildfires that could potentially decrease habitat viability for the threatened, endangered and sensitive wildlife species for an extended period of time. Additionally, this analysis assumes that species will benefit as the proposed action, fuels reduction and prescribed fire continues to return ecosystems to a more natural historic fire return interval.

All species under the "no action" alternative will have a greater likelihood of experiencing catastrophic wildfire.

4.3.3.1 Threatened and Endangered Species

4.3.3.1.1 Gunnison Sage-grouse

There will be no impacts to individuals in the no action alternative over the short term that differs from current management. Current management is full suppression of all fires. Full suppression does impact Sage-grouse if it occurs in Critical habitat. These impacts would largely be similar to the impacts under the proposed action in the short term. However over longer periods of time there will be potential impacts to habitat that may impact individuals. For that analysis see the section on critical habitat below.

4.3.3.1.2 Gunnison Sage-grouse Critical Habitat

Over the short and long term the no action would neither degrade nor improve habitat for Sage-grouse. Under both the no action and proposed action alternative, there would be no difference in management for the San Miguel population as there is no current action occurring under any alternative on occupied habitat, the only type of habitat in Dry Creek Basin. In Dove Creek, however, there are 34,153 acres of unoccupied habitat that would only experience full suppression. Consequently, the actions that were tailored to benefit Sage-grouse under the proposed action (i.e. removing encroached vegetation from sage parks), would not occur and no habitat would be improved for Sage-grouse (i.e. no potential benefits would be possible). The negative effects of burning would also not occur under this alternative. No sagebrush would be

lost due to fires managed under the proposed action. However, some sage may be lost as a result of full suppression. Removal of sagebrush over story vegetation is an issue in Dove Creek that needs to be addressed. The no action would in no way address this issue.

4.3.3.1.3 Mexican Spotted Owl

Under the no action alternative, direct impacts to individuals or habitat would not occur that differs from current management. With no treatment of habitat within the project area things will largely stay the same. Ongoing fuels treatments will continue to reduce the potential for stand replacing wildfire, however there will be no potential additional treatment. One of the reasons MSO were listed was the continued threat of stand replacing wildfire. The no action and the proposed action differ only in how much fire may burn in an area. The no action will largely result in smaller fires that impact only small amount of vegetation, while suppression tactics will largely have a greater footprint.

4.3.3.2 Bald and Golden Eagle

The no action effects will be similar for both golden and bald eagle so they will be analyzed together to reduce repetition.

The most vulnerable life history component to direct effects, for both species, is their nests. Under the no action alternative there would be no chance of a fire managed under the proposed action overcoming a nest and destroying it. Compared to the proposed action alternative, the no action would only be different if in the unlikely event a nest was destroyed.

Indirect, or less direct, impacts will not occur under the no action as there is no action. However, no action, again, implies that there will be a greater likelihood of larger fires across the landscape. Largely because they require a greater amount of infrastructure, large fires tend to indirectly impact species to a greater degree than small contained fuels reducing managed fires. When large fires occur they can also completely remove some forested habitats. To a large degree, neither of these species area forest obligates nor may an opening or removal of forest canopies improve habitat for golden eagles, while decreasing potential nest sites for bald eagles, especially near water.

4.3.3.2 Migratory Birds

The no action alternative will have no impact on individual raptor nest sites or raptor habitat that differs from current management. There will be a decreased likelihood of disturbance to raptors and destruction of nests under the no action. However, the no action limits the ability of the BLM to use natural fire as a tool to control fuels. 1,000 acre fires per year are going to be beneficial to most migratory bird species. These benefits would not occur under the no action.

4.3.4 Cultural Resources

Historic fire suppression regimes have disrupted the timing of natural fire cycles, resulting in more densely vegetated areas with an increased likelihood for high intensity and severity wildland fires. Under the no action alternative, fuels would continue to accumulate, and fire

intensity and severity would continue to increase (Chapter 4.3.2), resulting in more potential for direct and indirect impacts to National Register listed and eligible sites. Direct effects from wildland fire, particularly high intensity/ severity fire, including the damage or destruction of cultural resources. Fire can incinerate wooden components of sites, scorch and spall rock art panels, destroy or alter artifacts and features, and compromise site research potential. High severity wildland fires also dramatically eliminate vegetation and increase the potential for soil erosion, which can indirectly contribute to the long-term degradation and destruction of archaeological resources. Wildland fire occurring under the no action alternative has more potential to impact cultural resources than managed wildland fires occurring under the proposed action.

Fire suppression actions that directly impact cultural resources include construction of hand lines, dozer lines, clearing staging areas, and off-road vehicle travel and retardant drops. Construction of dozer lines and clearing staging areas can obliterate cultural resources. Construction of hand lines, dozer lines, and staging areas, and off-road vehicle travel can crush, damage, or displace artifacts and features, thereby compromising the cultural context and information potential of archaeological sites. Off-road vehicle use can damage or displace site artifacts and features by churning and rutting surface and shallow subsurface soils. Ground disturbing suppression activities can alter soil movement, which can indirectly contribute to the long-term degradation and destruction of archaeological resources. Retardant drops can discolor standing architecture and obscure site artifacts and features and rock art. Fire retardant can stain cliffs and rock faces, potentially diminishing the integrity of historic properties for which setting, feeling, and/or association are important to their significance. Suppression caused damage to cultural resources would be higher under the no action alternative than under the proposed action, due to the intensive nature of fully suppressed wildland fire actions.

Under the no action alternative, the fire regime condition class would be less likely to return to near historic values across the entire planning area. This could result in more intense incidences of wildland fire behavior, dependent on the vegetation/fuels type involved. Regarding cumulative impacts to cultural resources, more severe wildfire behavior would have more overall potential to impact cultural resources.

4.3.5 Native American Religious Concerns

As the concern expressed by the responding tribes has, to date, been for known cultural resources, the no action impacts analysis for cultural resources (4.3.4) also applies to Native American religious concerns.

4.3.6 Wild Horses

Under the no action alternative all fires would be suppressed within the HMA. As a result the density of pinyon-juniper would increase and the overall productivity of the site including the existing perennial grass in the understory would decline. As a result, available forage for wild horses within this vegetation type would slowly be decreased.

4.4 Cumulative Impacts

4.4.1 Soils and Water-Dependent Features

The cumulative impacts of fire to watersheds are very dependent on the location, extent, and severity of the burns. Some TRFO watersheds are already affected by current and past land management activities including large-scale oil and gas development, high road densities, decades of intensive grazing and range/forage treatment activities, past large and high-severity burns. In addition, some watersheds with already high cumulative impacts are also more vulnerable to disturbance, and erosion increases saline runoff and include: Hamilton Creek-Naturita Creek, Narraguinnep Canyon-Alkali Canyon, Outlet Disappointment Creek, West Fork Dry Creek, Gypsum Gap-Disappointment Valley, and Broad Canyon. These watersheds have all or part of their extent within the Proposed Action alternative where fire can be used to meet TRFO management goals.

If large fires with substantial high severity burned areas were to occur in watersheds already sustaining high cumulative impacts from past and current land management, it is expected the cumulative impacts from fire could be greatest in these areas. It is not possible to quantify the cumulative effects without knowing where the burns would actually occur. The risk of incurring additional negative cumulative effects from fire is highest in the short term (1-10 years) with the Proposed Action Alternative where more acres would be burned thereby slightly increasing the risk that larger areas of high severity burning may occur.

In the long-term, the lower risk of incurring additional cumulative effects from fire is associated with the Proposed Action alternative. Allowing fires within fire-dependent ecosystems under environmental and weather conditions favorable for a mosaic of burn severities should reduce the long-term risk of uncharacteristically large/severe fires and provide the lowest risk of catastrophic impacts to watersheds. Properly functioning fire-dependent ecosystems within historic range of variability have the best chance of sustaining fire in a manner that mimics the fire regimes the watersheds evolved with, and may help minimize the extent of watershed damage on a landscape-scale.

4.4.2 Vegetation, Fire Management, & Fire Ecology

Within the proposed action area, based on vegetation type and mean fire return interval, historical average annual acreage burned in wildfires is estimated to be 3,875 acres per year. This equates to a ten year average of 38,750 acres. The proposed action would affect an area approximately 26% of that which historic conditions would be expected to. Combined with fires which will be managed with protection objectives, the proposed action would affect an area of 48% of the historic average. If current rates of mechanical vegetation treatment and prescribed fire continue, an additional 1,098 and 311 acres, respectively, per year would be impacted. Combined, the proposed action, fires managed for protection objectives, mechanical vegetation treatments, and prescribed fire would affect 3,274 acres per year, or 84% of the historic disturbance regime. While over ten years this only represents a fraction of the proposed action area, if the proposed action (within the fire emphasis area) and associated activities (across the planning area) were to continue into the future, FRCC and Succession Classes would be returned to near historical values across the entire planning area.

4.4.3 Wildlife

4.4.3.1 Threatened and Endangered Species

4.4.3.1.1 Gunnison Sage Grouse

Within the proposed action area, within sage-grouse occupied and unoccupied critical habitat, impacts consist of oil and gas, roads and vehicle traffic, conversion of historic habitat to agriculture and residential housing, fire suppression and fuels mitigation. Individuals may see a very slight increase in impact from this proposed action when agency personnel are accessing fires. However, when compared with full suppression tactics – the only other option for wildfire (also the No Action alternative) – an addition of impacts would be the potential for increased traffic on county roads outside of winter and breading season. The increase in traffic from the baseline may occur for an extended period (however long the fire burns). Increases will only occur during one year, and will only impact individuals for one year. May increase disturbance for a given year but will not have lasting impacts after the year of the fire.

Impacts to habitat over the long term, may decrease the amount of available sagebrush. This would be a cumulative decrease in sage in addition conversion of agriculture, road construction and oil and gas infrastructure. This additional loss would be 1,000 acres of sage loss compared to 92,981 acres of sagebrush loss due to agriculture. This additive loss would not be all negative either. Historically, removal of shrubs occurred by fire. This would, in a very small way, bring that process back.

4.4.3.1.2 Gunnison Sage-grouse Critical Habitat

Cumulatively, the largest impacts to Sage-grouse for the Dove Creek and Dry Creek sub-populations are conversion of private lands to agriculture, historic grazing practices and range management, energy development, power line, road construction and car traffic, and fuels reduction. These impacts, more specifically, conversion of habitat for agricultural reasons (primarily on private land) and past range management, dwarfs the proposed action and its impacts to Sage-grouse critical habitat. The proposed action may decrease the amount of sagebrush in some habitats that have tree or an excess of shrub cover. However, these impacts will largely be in areas that, although they are mapped as critical habitat, are not currently adequate for grouse. A decrease in the over story vegetation will improve habitat conditions for Sage-grouse in the long run when coupled with other treatments - a net benefit to the habitat. Therefore the cumulative effect would be beneficial.

4.4.3.1.3 Mexican Spotted Owl

Oil and gas development and exploration, fuels reduction, OHV use and road development, recreational rock climbing, and rafting all impact potential MSO habitat within the planning area. Given that the proposed action will likely improve habitat for MSO, there will be no cumulatively negative impact to MSO.

4.4.3.2 Bald and Golden Eagle

Cumulatively golden and bald eagles are impacted by oil and gas development and infrastructure, recreation (OHV use, rock climbing, mountain biking and camping) and recreational shooting. Given that treatments would occur within a given year in each 1,000 acre treatment area, eagles would only see very limited amounts of change within their habitat. Additionally, unless a nest trees is destroyed (and even in some cases if one is) habitats will not be completely destroyed under the action alternative and will likely remain suitable even if a disturbance does occur.

4.4.3.3 Migratory Birds

Other impacts to raptors within the proposed action area are Oil and Gas development, fuels reduction projects, and human disturbance through recreation and historic conversion of habitat to agriculture. The current loss of vegetation, fragmentation of habitat, disturbance for initial construction and drilling, maintenance, and resource transportation cumulatively have a far greater impact than 1,000 acres of fire, a natural process that ecosystems rely on. Given the severity of other activities within proposed action area, fires managed under the proposed action may disturb small portions of some raptor populations but will have little impact to species in comparison to existing disturbances.

4.4.4 Cultural Resources

The Fire Ecology cumulative impacts analysis in this document indicates that if the proposed action, in combination with fires managed for protection objectives (suppressed wildfire), mechanical vegetation thinning treatments, and prescribed fire were to continue into the future, fire regime condition class would return to near historic values across the entire planning area. This should result in more moderate wildland fire behavior, dependent on the vegetation/fuels type involved. Regarding cumulative impacts to cultural resources, less severe wildfire behavior would have less overall potential to impact cultural resources.

4.4.5 Wild Horses

Within the HMA cumulative impacts include existing roads, increased visitors for big game hunting in the fall and public viewing of wild horses. Wild horse populations within the HMA may see an increase in impact from this proposed action when agency personnel are accessing fires. However, when compared with full suppression tactics there would be an increase in the amount of activities with the HMA related to fire crews, vehicles and disturbance associated with fire management activities.

CHAPTER 5: PERSONS, GROUPS, AND AGENCIES CONSULTED

5.1 Persons, Groups, and Agencies Consulted

Table 5.1.1: List of Persons, Agencies and Organizations Consulted		
Name	Purpose & Authorities for Consultation or Coordination	Findings & Conclusions
Kurt Broderdorp, Biologist, US Fish & Wildlife Service	Discussion of effects of the proposed action on Gunnison Sage Grouse Unoccupied Critical Habitat.	Consultation under section 7 of the ESA would occur prior to the proposed action occurring within Gunnison Sage Grouse Unoccupied Critical Habitat.
Sarah Gallup, Air Pollution Control Division, Colorado Department of Public Health and Environment	Clarification on AQCC Regulation 9, which states, "Wildfires are beyond the scope of this regulation and no permitting requirements apply to a land manager within whose jurisdiction a wildfire occurs."	Air quality not carried forward for analysis.
Multiple Native American Tribes (Appendix B for full list)	Tribal Consultation Requirements	The Hopi Tribe, Pueblo of Santa Clara, and Pueblo of San Filipe all expressed the importance of cultural resources, and the Hopi requested a copy of the Draft EA for further review.

5.2 List of Preparers

Table 5.2.1: List of Preparers		
Name	Title & Agency	Responsible for the Following Section(s) of this Document
Brad Pietruszka	Fuels Program Manager, Southwest District BLM	IDT Lead, Vegetation, Fire Management & Fire Ecology
Bruce Bourcy	Archaeologist, Tres Rios Field Office	Cultural Resources
Kelly Palmer	Hydrologist, San Juan National Forest	Soils and Water-Dependent Features
Mike Schmidt	Wildlife Biologist, Tres Rios Field Office	Wildlife
Mike Jensen	Rangeland Management Specialist, Tres Rios Field Office	Invasive Species, T&E Vegetation, Wild Horses

5.3 Comment Analysis and Response

Table 5.3.1: Comment Analysis				
Number	**Commenter**	**Resource/ Concern**	**Comment**	**Response**
1	Hopi Tribe	Cultural Resources	The Hopi Tribe requested a copy of the Class I overview of the area of potential effect	A summary of cultural resources in the planning area is provided in Chapter 3.6
2	Hopi Tribe	Cultural Resources	The Hopi Tribe expressed concerns with how the BLM proposes to ensure unidentified sites in areas which have not been inventoried are not adversely impacted by managed wildland fire.	See below
3	Colorado Parks and Wildlife	Wildlife	CPW had minimal concerns regarding the proposed action, and identified the proposed action as their preferred management for wildlife species and their habitats.	None.

The second comment by the Hopi Tribe is addressed in the following chapters: Chapter 2.4.3 adds a design feature to the proposed action to protect cultural resources; Chapters 3.6 and 3.7 were updated to include more detailed information on the existing inventories in the project area; Chapter 4.2.4 assesses conditional burn probability and conditional flame lengths under the proposed action; Chapters 4.2.6 and 4.2.7 were updated to address site densities relative to conditional burn probability and flame lengths under the proposed action area; Chapter 4.3.2 assesses conditional burn probability and conditional flame lengths under the no action alternative; Chapters 4.3.4 and 4.3.5 were updated to expand on effects on cultural resources from the no action alternative.

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APPENDIX B: TRIBAL CONSULTATION LIST

The following tribes were consulted during the development of this Environmental Assessment:

1. Jicarilla Apache Nation
2. Kewa Pueblo (Pueblo of Santo Domingo)
3. Navajo Nation
4. Ohkay Owingeh (Pueblo of San Juan)
5. Pueblo de Cochiti
6. Pueblo of Acoma
7. Pueblo of Isleta
8. Pueblo of Jemez
9. Pueblo of Laguna
10. Pueblo of Nambe
11. Pueblo of Picuris
12. Pueblo of Pojoaque
13. Pueblo of San Felipe
14. Pueblo of San Ildefonso
15. Pueblo of Sandia
16. Pueblo of Santa Ana
17. Pueblo of Santa Clara
18. Pueblo of Taos
19. Pueblo of Tesuque
20. Pueblo of Zia
21. Southern Ute Indian Tribe
22. The Hopi Tribe
23. Ute Indian Tribe (Uintah & Ouray Reservation)
24. Ute Mountain Ute Tribe
25. Ysleta del Sur Pueblo
26. Zuni Tribe of the Zuni Reservation